

FLIGHT

The
AIRCRAFT ENGINEER
AND AIRSHIPS

First Aeronautical Weekly in the World. Founded January, 1909

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 1114. (Vol. XXII. No. 18.)

MAY 2, 1930

Weekly, Price 6d.
Post free, 7½d. Abroad, 8d.

Editorial Offices: 36, GREAT QUEEN STREET, KINGSWAY, W.C.2.
Telephone: Editorial, Holborn 1884. Advertising, Holborn 3211
Telegrams: Truditur, Westcent. London.

Annual Subscription Rates, Post Free.
United Kingdom .. 30s. 4d. Abroad .. 33s. 0d.*

* Foreign subscriptions must be remitted in British currency. (See last Editorial Page.)

CONTENTS

Editorial Comment:	PAGE
The Zeppelin "Raid"	471
England Doing Well	472
The Prince Flies Home	473
Graf Zeppelin Visits England	474
The Avro "Trainer"	475
King's Cup	483
Croydon Notes	483
Private Flying	484
Duchess of Bedford Returns	489
Airisms from the Four Winds	489
Irvin Parachute	490
Air Transport	491
Correspondence	492
The Schneider Trophy, 1929	494
Royal Air Force	495
In Parliament	496

DIARY OF CURRENT AND FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list—

1930	
May 2 ..	A.I.D., T.S.A. Dinner at Hotel Russell.
May 10 ..	N.F.S. Air Meeting, Leeds.
May 17 ..	Flying Display and Opening of Brooklands Aero Club.
May 31 ..	Official Opening and Air Pageant, Bristol Airport.
June 7 ..	N.F.S. Air Meeting, Reading.
June 9 ..	Northampton Flying Meeting.
June 14 ..	Manston Garden Party.
June 19 ..	N.F.S. Air Meeting, Nottingham.
June 19 ..	Household Brigade Flying Club Meeting at Heston.
June 21 ..	Air Rallye at Haldon Aerodrome, Teignmouth.
June 26 ..	Ipswich Air Pageant.
June 27 ..	R.A.F. Dinner Club Annual Dinner.
June 28 ..	Royal Air Force Display, Hendon.
July 5 ..	King's Cup Race and Hanworth Air Pageant.
July 19 ..	N.F.S. Flying Meeting, Leeds.
July 19 ..	N.F.S. Flying Meeting, Hull.
July 20- Aug. 7 ..	International Light Plane Tour of Europe, starting from Berlin.
July 26 ..	Norwich Flying Meeting.
July 31 ..	Entries close for 1931 Schneider Trophy Contest.
Sept. 1-6 ..	5th International Air Congress at The Hague.
Sept. 6-28 ..	Aero Exhibition, Stockholm, Sweden.
Sept. 20 ..	Liverpool Air Pageant.
Sept. 27 ..	N.F.S. Air Meeting, Hanworth.
Nov. 28 ..	
Dec. 14 ..	Paris Aero Show.
Dec. 31 ..	Closing date for the Aga Khan's Prize for Indian Flight.

EDITORIAL COMMENT



The
Zeppelin
"Raid"

THE airship "season" started well when, on Saturday last, the German airship *Graf Zeppelin* paid a short, but successful visit to the Royal Airship Station at Cardington. It must be admitted, however, that the fates were uncommonly kind. The attempt might have been made fifty times hardly so successfully. We are not, of course, referring to the flight of the German airship. After her numerous previous cruises, including a trip around the world, the flight from Friedrichshafen to Cardington and back was a mere "hop." But the feat of transferring passengers from the airship to the ground, and *vice versa*, was one which required almost perfect weather conditions. And Saturday last produced them. The wind was slight, and the sun was obscured by clouds, so that no sudden changes in temperature caused the airship to become alternatively "heavy" and "light." Else the manhandling of the airship by the ground crew would have been extremely difficult, not to say impossible. As it was, everything went off without a hitch, and Dr. Eckener was able to board the airship at Cardington and take command of her on the return flight.

The occasion was memorable as being the first since the war when a German airship established contact with British soil. The nature of the contact was somewhat different: instead of the bombs of the war period, the *Graf Zeppelin* discharged peaceful passengers, and in place of the British anti-aircraft shells from the ground forces and tracer bullets from the machine guns of aircraft, the German airship was escorted by peaceful aircraft, and safely held near the ground while the exchange of passengers was effected. The whole event may be said to have been symbolical of the change in feeling between the German and British nations, and it is to be hoped that the visit of the *Graf Zeppelin* will be but the forerunner of many friendly interchanges of courtesy between the airship people of the two countries. We are certain, in fact, Dr. Eckener said as much, that should the occasion arise for one of the British

airships to make a call at Friedrichshafen, it and its crew will be as heartily welcomed as were the Germans at Cardington last Saturday.

We hope also that close co-operation between British and German airship interests, and more particularly in the matter of airship operation, will be established in the not too distant future. As Dr. Eckener stated during a chat with the editor of this journal, airship operation must, in the very nature of things, be based on international foundations, and we are quite certain that, in Germany, Great Britain will meet with nothing but the greatest willingness to co-operate in any way possible. Real airship work is only now about to commence in real earnest, and at this juncture it is necessary to make such arrangements internationally, as will facilitate the use by the airships of one nation of the airship stations and bases of another. The subject of moorings obviously intrudes itself. The fates were kind last Saturday, but evidently for serious airship operation one cannot trust to the weather permitting manhandling of airships. Some form of mooring gear must be made standard the world over, and the subject should not be permitted to recede into the background. It may be no easy matter to achieve agreement, but if existing and future airship bases the world over are to attain their full measure of usefulness, it is essential that agreement should be reached. Mooring is only one of several items upon which some form of standardisation should be sought, but it will serve as an example of the others.

On the subject of the flight of the *Graf Zeppelin* over the Stadium at Wembley, it is not necessary to dwell at any length. That the passing of the airship was not unanimously welcomed it would be futile to deny. That, however, is of minor importance. The psychology of a football crowd is somewhat peculiar. But those in touch with public feeling, generally, cannot have failed to notice in certain quarters, traces of slight irritation at the very idea of a Zeppelin airship visiting England. One might have thought that the memories of the war, 1914-18, would no longer cause such feeling of resentment. Yet, apparently, the effect of the air raids has not

entirely passed. We do not say the feeling was strong, certainly not sufficiently so to amount to hostility. But that a slightly unfriendly feeling did exist in some sections of the public cannot, we think, be denied. The fact is regrettable, the more so as a section of British aviation, the Easter party from Heston to wit, was received with the utmost cordiality and friendliness during the recent tour of Europe. Whatever may apply to the general public, the aviation folk of the different countries entertain nothing but the greatest goodwill towards each other, and that is why we welcome sincerely and enthusiastically such visits as that of the *Graf Zeppelin*, and such tours as that of the Heston party. The more we have of that sort of intercourse with each other, the less likelihood is there of any traces of unfriendly feelings remaining.

❖ ❖ ❖

One way and another, British aviation has been doing rather well of late. The magnificent flight of Her Grace the Duchess of Bedford, with her pilots, Barnard and Little, on an old Fokker F.VII

England Doing Well

fitted with Bristol "Jupiter" engine, to the Cape and back in an incredibly short space of time; the use by His Royal Highness the Prince of Wales of a Westland "Wapiti," also with "Jupiter" engine, for the journey from Marseilles to Windsor; and the recent successful Easter tour of Europe by a score of privately-owned aeroplanes from Heston. All three have served to draw the attention of the world to the high state of development which aviation in general, and British aviation in particular, has attained. When persons of such eminence as the Prince of Wales and the Duchess of Bedford make use, and excellent use at that, of aircraft for their long journeys, it is surely proof of faith in the safety and speed of air travel. And when some twenty light aeroplanes can make a protracted tour of a number of European countries, making visits here, there and everywhere, with but two forced landings and no damage or casualties whatever, the fact cannot but impress the man in the street with the progress which flying has made.



THE LATEST "AUTOGIRO": Fitted with an Armstrong-Siddeley "Genet Major" engine, this machine^e is characterised by a rotor of somewhat different design, with larger blades and lower speed. The performance^e has improved in various respects, and altogether this latest type is said to mark yet another step forward in the evolution of a very interesting aircraft type. (FLIGHT Photo.)

THE PRINCE OF WALES FLIES HOME



AFTER a magnificent flight from Marseilles, H.R.H. the Prince of Wales arrived home from Africa on April 25, when he landed on his private aerodrome in Windsor Great Park. Quite a considerable portion of the Prince's journey home has been carried out by air. The Prince and his party left Malakal on April 13 in R.A.F. Fairey IIIF machines and flew to Khartoum, via Kosti. The journey was continued on April 16 to Wadi Halfa and Assuan, and Cairo was reached the following day.

The Prince proceeded by the P. and O. liner *Rawalpindi* to Marseilles, where he arrived on April 25 at 5.45 a.m. Meanwhile, three R.A.F. machines—one a Westland "Wapiti" piloted by Sqdn.-Ldr. Don, and the others, a Fairey IIIF piloted by Flight-Lieut. A. W. Heslop and another "Wapiti" piloted by Flying Officer H. W. Pearson-Rogers—set out from Northolt on April 22 for Marseilles, where they arrived on April 24, for it was announced that, weather permitting, the Prince would make the last stage of the journey home by air.

Thus, immediately the *Rawalpindi* docked, the Prince, who wore a light grey suit with a grey-blue pull-over, and his party motored to the Marignane aerodrome, where the three R.A.F. machines were in readiness.

At 7.35 a.m. the three machines started off, the Prince in the "Wapiti" piloted by Sqdn.-Ldr. Don. At 9 a.m. they landed at Bron Aerodrome, Lyons, to refuel, having covered the 175 miles from Marseilles in 1 hr. 30 min. Here

Twenty-five minutes later the flight was resumed, and the next stop was Le Bourget. No members of the public were allowed on the ground, but the Prince was greeted by the British Ambassador, Lord Tyrrell, and officers of the 34th Air Regiment. After luncheon, at the regimental mess, several officers asked the Prince to sign their pilot cards, which he did, but when, shortly after, some 40 more made the same request, he smilingly said he was afraid he would have to leave that for a future occasion.

At 1.45 p.m., amid enthusiastic cheers, the Prince set off again, escorted by nine French aeroplanes led by Capt. Lackeman. The French coast was crossed at 3 p.m. at Grisnez, where the French escort left them, and in "exchange" a R.A.F. flying-boat took over escort duties across the Channel.

The crossing took 15 minutes, and on reaching the English coast nine "Siskins" of No. 25 Squadron (Hawkinge) met them and escorted them to Windsor. At Windsor the "Siskins" and the two other machines which accompanied the Prince from Marseilles turned off and returned to their bases, and the Prince's "Wapiti" made a perfect landing, at 4 p.m., on his private landing ground at Canadian Camp (Smith's Lawn), in Windsor Great Park. Thus the 650 miles from Marseilles was covered in 6 hr. 10 min. flying time, or at a speed of 105 m.p.h.

Just before the Prince landed the King and Queen drove from Windsor to the Fishing Cottage at Virginia Water, where they were to receive him. When the Prince landed he was greeted by Prince George, a few friends and his pet terrier, Cora. His Highness looked remarkably well and



THE PRINCE OF WALES ARRIVES BY AIR AT WINDSOR : The Prince flew from Marseilles in a Westland "Wapiti," piloted by Sqdn.-Ldr. Don, which is seen in the centre of our picture, the Prince being in the group standing by the car on the right.

the Prince made a brief speech to the officers of the 35th Air Regiment, saying:—

"I made a special point of stopping at Lyons to thank you for the fraternal courtesy you showed the other day in so cleverly repairing one of the aeroplanes that was coming to meet me. I hope the following wind which has helped me so far through the fine sky of France will accompany me right to the English coast."

bronzed, and lost no time in shedding his flying jacket, coat, and pull-over.

After a welcome cigarette and a few minutes' chat, the Royal car arrived, and the Prince, together with Prince George, drove to the Fishing Cottage to join the King and Queen, and where the Prince stayed some time for tea and tales of adventure. Later the Prince went on to Fort Belvedere, and thence to York House.



GRAF ZEPPELIN VISITS ENGLAND

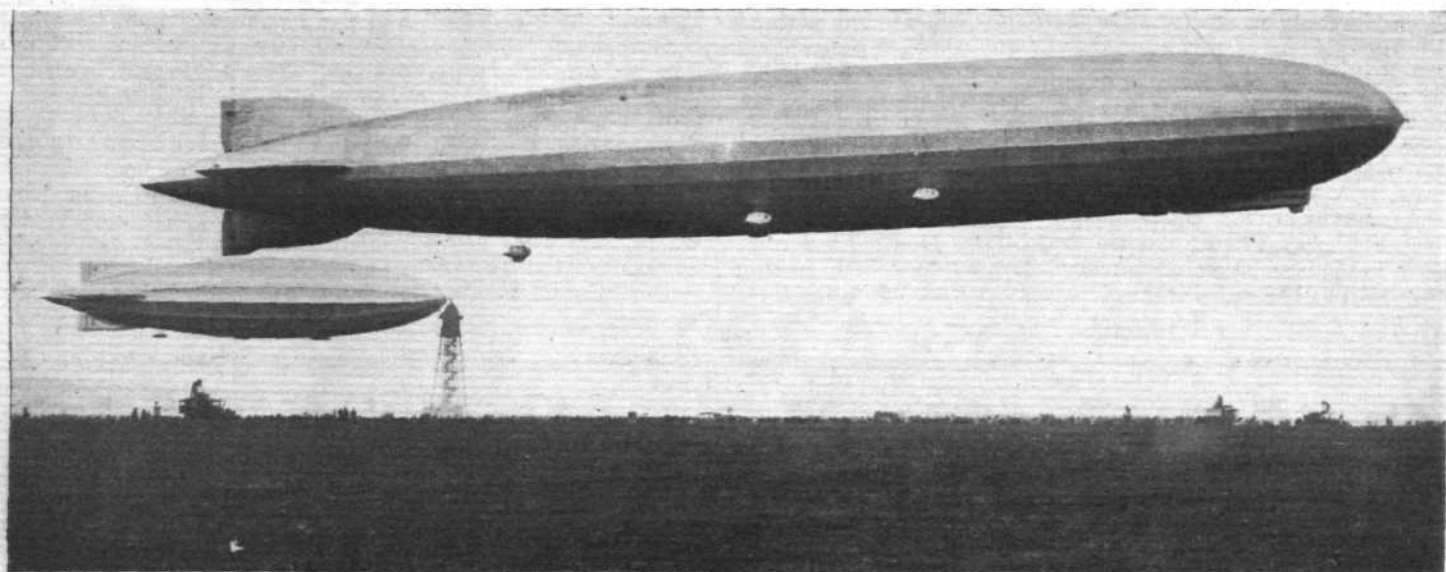
LAST Saturday, April 26, the German Zeppelin LZ 127, *Graf Zeppelin*, paid a flying visit to this country. The flight was one of many successful trips that have been accomplished by this airship, which is shortly to undertake an experimental commercial transatlantic flight.

The *Graf Zeppelin* left Friedrichshafen, under the command of Capt. Lehmann with 22 passengers (including Lady Drummond Hay and Mrs. Cleever) and mails, at 6.2 a.m. and passed over the following places—Basle (7.35 a.m.), Besancon (8.50 a.m.), Dijon (9.30 a.m.), Paris (11.55 a.m.), Brighton (3.16 p.m.), London (4 to 4.40 p.m.), Cardington (arrive) 5.15 p.m. During the cruise over London the airship flew very low and passed over Wembley, where the Cup Final was being played, dipping in salute to the King.

Large crowds gathered at Cardington, and the barriers and police could not prevent them from swarming round when the airship landed. The landing—a ground one, for although

by Colonel the Master of Sempill, President of the Royal Aeronautical Society, spoke at some length on the future development of the airship. He gave a vivid description of the difficulties and uncertainties of his first trip round the world. In the course of that description, he revealed that much of the country over Siberia and China was, for all practical purposes, uncharted. He was compelled to rely upon guide books and uncertain maps, with the result that mountain ranges which were stated to be 1,000-1,500 m. high he found were some 2,000 m. altitude. The heavily-loaded condition of the *Graf Zeppelin* did not allow her to rise above 1,500-1,800 m. over the European and Asiatic part of the route. The airship ultimately crossed through a pass at 1,800 m., the peaks on each side towering 300-400 m. above the ship.

One of the very remarkable points in Dr. Eckener's address was his description of the way he decided to make use of a



THE GRAF ZEPPELIN ARRIVES AT CARDINGTON: Moored to the mast in the background is the R 100, and an interesting comparison of the two ships is thus afforded. The relative dimensions are: R 100—length, 709 ft., diameter 133 ft., capacity 5,250,000 cub. ft. L.Z.127—length, 772 ft., diameter 100 ft., capacity 3,710,000 ft.

the *Graf Zeppelin* is provided with mooring gear, it was not possible to moor her to the mast at Cardington, which was already occupied by R 100—was very successfully and smartly carried out. The Zeppelin came in low, head to wind, in a series of "dives," and when 100 ft. from the ground, the handling party took the ropes, the engines were stopped and the airship brought gently to earth.

Baggage and mails were unloaded, and the officers and passengers were received by Comm. R. B. B. Colmore, Director of Airship Development. Capt. Lehmann disembarked and handed over to Dr. Eckener, and then the passengers who were to make the return flight got aboard. These included Air Vice-Marshal Sir Sefton Brancker, Air Commodore and Mrs. J. G. Weir, the Master of Sempill and Mrs. Forbes-Sempill, Lieut.-Col. V. C. Richmond, Comm. H. Campbell (Equerry to the Duke of York), Sqdn.-Ldr. F. M. Rope, Mr. David Boyle, Miss Carstairs, Miss Jenkins, Mr. Campbell-Begg, Dr. and Frau Solmssen, and Mr. M. H. Vol.

During the time the Zeppelin was on the ground a good opportunity was afforded for a comparison with R 100—the fuller lines of the latter being very marked. *Graf Zeppelin* is 772 ft. in length and 100 ft. in diameter as against 709 ft. in length and 133 ft. in diameter for R 100. The latter's capacity, however, is 5,250,000 cub. ft. as compared with 3,710,000 cub. ft. for the German ship.

Shortly before 6 p.m. the signal was given to cast off, and tilting her nose up steeply, the airship flew rapidly away towards the south, Dr. Eckener waving good-bye from the control car and the crowds cheering loudly.

On the return flight the airship again passed over London and then made for Dover, which was reached at 8.15 p.m. Hamburg was passed at 10 p.m., and at 6.42 a.m., April 27, the *Graf Zeppelin* landed at Friedrichshafen, having completed the round trip in approximately 24 hours.

Dr. Eckener (who arrived in England on April 23), at a dinner given in his honour at the Athenæum, on April 24,

tornado which was moving eastwards. He first heard of the tornado when crossing Asia. Till then the airship had been using only four engines, but five were brought into use, and Dr. Eckener ordered full speed ahead to catch up the typhoon. Behind it, as he explained, there would be a favourable wind. As a result of keeping in touch with the typhoon, the *Graf Zeppelin* crossed the Pacific to San Francisco at a record speed. As he vividly put the problem, "Typhoons are not comfortable things, but we don't let them play with us, we play with them!"

Dr. Eckener divided the problems which had got to be solved to place airships on a firm commercial basis into three. The first was the necessity for the use of helium. With an experienced crew there was not the slightest danger from the use of hydrogen, but the time was rapidly coming when there would be many airships, and the crews would not have the necessary experience to ensure that complete regard for safety which was so necessary. Practically all the helium supplies came from the United States, but he thought, as a result of his recent visit there, that the problem of an ample supply of the gas would be solved. He had no doubt indeed that all future airships would be using helium and not hydrogen. Airships were an international problem and the whole organisation of airship traffic must be based on that conception.

The second problem to be solved was that of suitable airports. Airports must be chosen not only for the general suitability of their positions for traffic, but so that there was a prevailing wind during most of the year, so that these ships could be taken into their hangars without the difficulty to be faced of a cross wind. At Friedrichshafen they had the protection of the Alps, with the result that they had little difficulty in taking the airships in and out of their sheds. He appreciated the experiments which were being carried out with mooring masts, but he still believed that the suitable choice of airports was vital.

(Concluded on page 488)

THE "AVRO TRAINER"

A New Machine with Many Interesting Features

SO long has the 504 been in existence as a type, and so well has it done its work, that the thought that some day it must of necessity be replaced seldom occurs to one. Without thinking much about it, one has come to take the good old 504 for granted. It was first produced in 1913, underwent development during 1914 and onwards, and during the war was used for a variety of purposes (for example, as a bomber of Zeppelin sheds!) finally to become standardised as the world's finest training machine. And although modern ideas of what constitutes a good bomber are a little different from what they were in 1914 and '15, the famous 504 is still the standard training machine of many air forces. It has been slightly modernised, it is true, but in all essentials it is the same machine as the prototype of 1913. A period of usefulness of 17 years is sufficient for any aircraft type, although there is no reason to doubt that the 504 will still be going strong when it attains, as a type, its twenty-first birthday.

In the meantime, modern demand will not be denied, and progress cannot be stopped by sentimental affection. The time has come when the old faithful machine must have a successor; and after 17 years of experience with the old machine, what could be more natural than that the Avro firm should produce that successor? In designing a new training machine the Avro engineers, headed by Mr. Roy Chadwick (who was with A. V. Roe in the early days, and who has remained with the firm ever since), would be expected to retain those features which made the 504 such a success. It is not altogether easy to assign relative values to the different characteristics of the 504, but to us it has always

seemed that much of the secret of the phenomenal popularity of the 504 is to be found in the large-span, high aspect ratio, heavily-staggered wings and long fuselage, giving a good lever arm to the tail surfaces and getting them fairly well clear of the downwash. And if one examines the new "Avro Trainer" (as the successor to the 504 is called) it

will be found that those features are retained. In fact, although the *Trainer* has scarcely a single dimension in common with the 504, the "family likeness" is quite striking. The two most marked changes are: the different shape of the rudder, and the different undercarriage.

It is on the practical rather than on the aerodynamic side that one would look for improvements in the *Trainer*, and one does not look in vain. Rarely have we seen a machine in which the user's point of view has so evidently been studied. The machine is primarily intended for training purposes, and the requirements of training have quite obviously been kept prominently in view throughout the design. Large, comfortable cockpits, good view, effective windcreens, an undercarriage of wide track, these are some of the features of the *Trainer*.

Constructional Features.

One of the innovations introduced in the *Avro Trainer* is that it is of all-metal construction (with exception of the fabric covering and the wooden

fairings of the fuselage) in order to conform to the requirements of the Air Ministry. In this connection it is of interest to recall that it was an Avro 504 which, if we are not mistaken, was the first British machine to have a welded steel tube fuselage. Although that was built many years ago, and the Avro firm had not then the practical

THE AVRO "TRAINER"

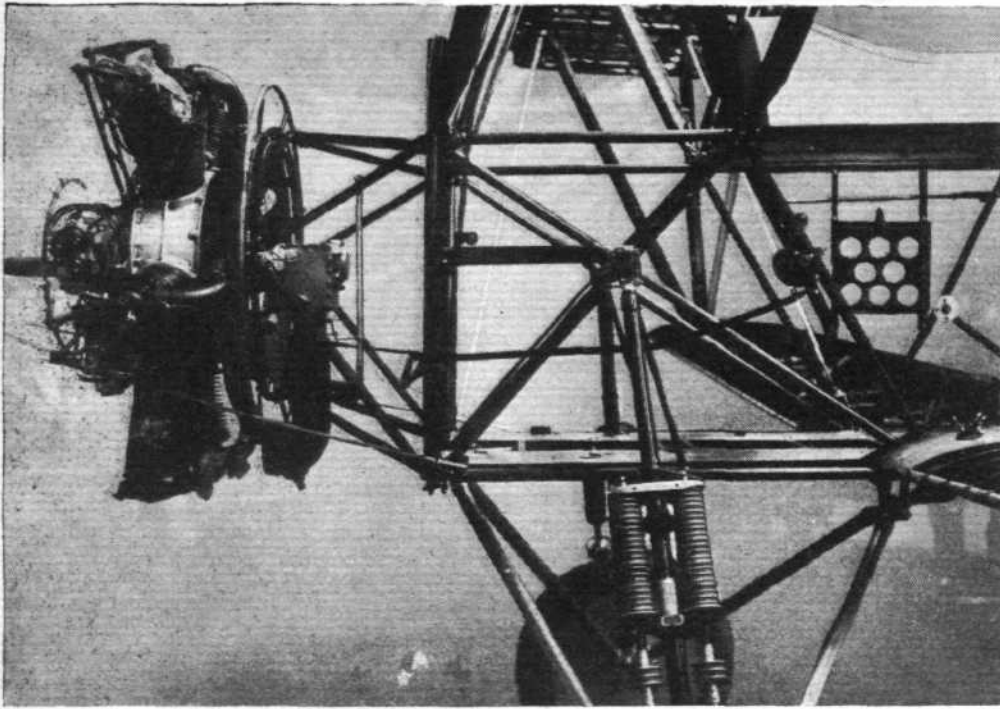
"Mongoose" Engine

Length o.a.	..	26 ft. 7½ in. (8.1 m.).
Wing Span (top)	..	34 ft. 0 in. (10.36 m.).
" (bottom)	..	34 ft. 0 in. (10.36 m.).
Wing Chord (top)	..	4 ft. 9 in. (1.45 m.).
" (bottom)	..	4 ft. 9 in. (1.45 m.).
Total Wing Area (incl. ailerons)	..	300 sq. ft. (27.9 m. ²).
Tare Weight	..	1,508 lb. (685 kg.).
Petrol (30 galls.)	..	228 lb. (104 kg.).
Oil (3 galls.)	..	30 lb. (13.6 kg.).
Pilot, pupil, & equipment	..	452 lb. (205 kg.).
Total Load carried	..	710 lb. (322 kg.).
Total Loaded Weight	..	2,218 lb. (1,008 kg.).
Wing Loading	..	7.4 lb./sq. ft. (35.8 kg./m. ²).
Power Loading (on max.)	..	13.43 lb./h.p. (6.1 kg./CV.).
" " (on normal)	..	14.8 lb./h.p. (6.7 kg./CV.).
Max. Speed, G.L.	..	110 m.p.h. (177 km./hr.).
Max. Speed at 5,000 ft.	..	109 m.p.h. (175 km./hr.).
Max. Speed at 10,000 ft.	..	98 m.p.h. (158 km./hr.).
Cruising Speed	..	95 m.p.h. (153 km./hr.).
Landing Speed	..	46 m.p.h. (74 km./hr.).
Rate of Climb (initial)	..	675 ft./min. (3.43 m./sec.).
Time to 1,000 ft. (305 m.)	..	1.54 min.
Time to 5,000 ft. (1,525 m.)	..	9 min.
Time to 10,000 ft. (3,000 m.)	..	25.1 min.
Service Ceiling	..	12,400 ft. (3,780 m.).
Absolute Ceiling	..	14,500 ft. (4,420 m.).

$$\text{Everling "High-speed Figure"} = \frac{\eta}{2k_D} = 16.5.$$



THE "AVRO TRAINER": Three-quarter Front View. The Fabric Fairings are made as detachable units to facilitate inspection of the Fuselage Structure. (FLIGHT Photo.)



The Skeleton of the "Avro Trainer" Nose, showing Engine Mounting, etc.

experience in this form of construction which is now available, the metal fuselage 504 was a good deal lighter than the standard machine.

In the *Trainer* fuselage the modern form of Avro welded tube construction is employed. This is a development of the type of construction which has been used by Fokker for very many years, a development which takes into account the British disinclination to trust implicitly a welded joint which is subject to tensile loads. Fokker uses welding in tension, and apparently without any ill effects ever having become manifest. But although British opinion is gradually changing from one of open hostility to the welded joint to one tolerating the use of welding with discretion, we still cannot bring ourselves to hang our lives, so to speak, on a tension-stressed welded joint. Thus, in places where doubtless Fokker would employ a simple welded joint, the Avro firm has sought and found ways of avoiding direct tension on a joint unless it is strengthened by some form of reinforcement.

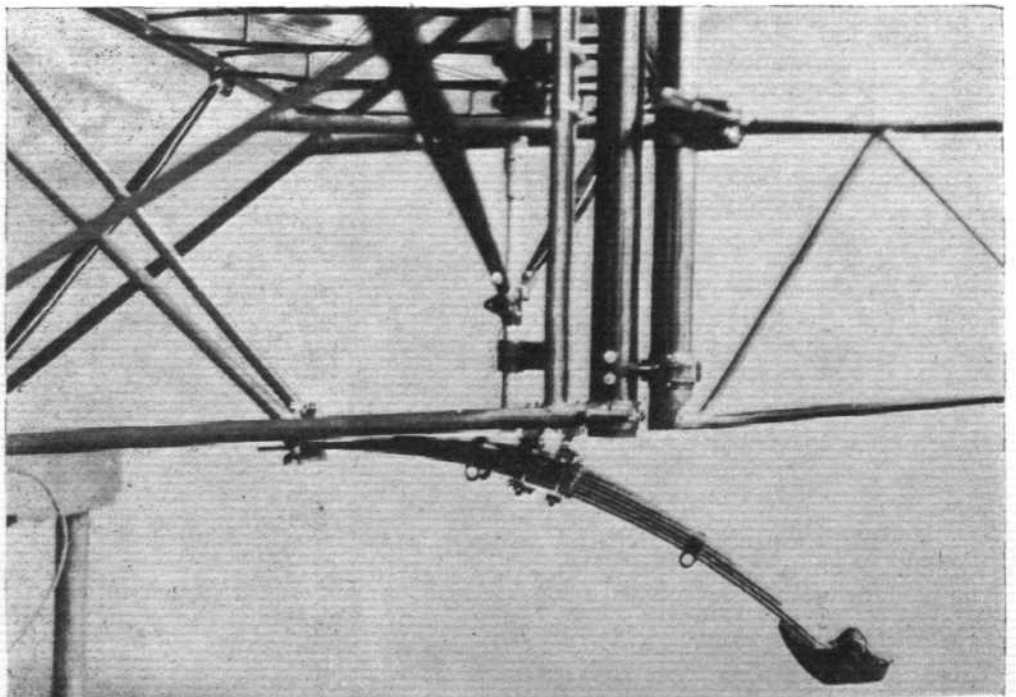
While on this subject of welding, it is worth while putting on record certain facts which have recently come to light concerning the durability of a welded steel tube fuselage. The Fokker firm, as a result of very long experience, has always claimed that the *inside* of a steel tube longeron never corrodes. We personally, and we believe a good many others in this country, have been inclined to be a little sceptical on this point. (We feel sure Mr. Stephan will not see in this scepticism any tendency on our part to doubt the sincerity of his claims). But "seeing is believing." Not very long ago the Fokker monoplane "Spider," on which her Grace the Duchess of Bedford has just made her record-breaking flight, was sent to Avro's Manchester works for inspection and overhaul. The firm thought this would be a suitable opportunity to examine the fuselage structure thoroughly. Accordingly short lengths of longeron, struts, etc., were cut out of the fuselage so as to inspect the interior for any traces of corrosion. In the words of Mr. Dobson, the tubes looked "like rifle barrels." Not a speck of rust anywhere. Evidently in welding up the various joints, practical airtightness is achieved, or at least if there is any opening

it is so small that only minute quantities of fresh air can find its way into the tubes. Consequently the amount of oxygen present is not sufficient to start corrosion. It is worth placing this fact on record in view of the gradually increasing use which is now being made of welded steel tube construction.

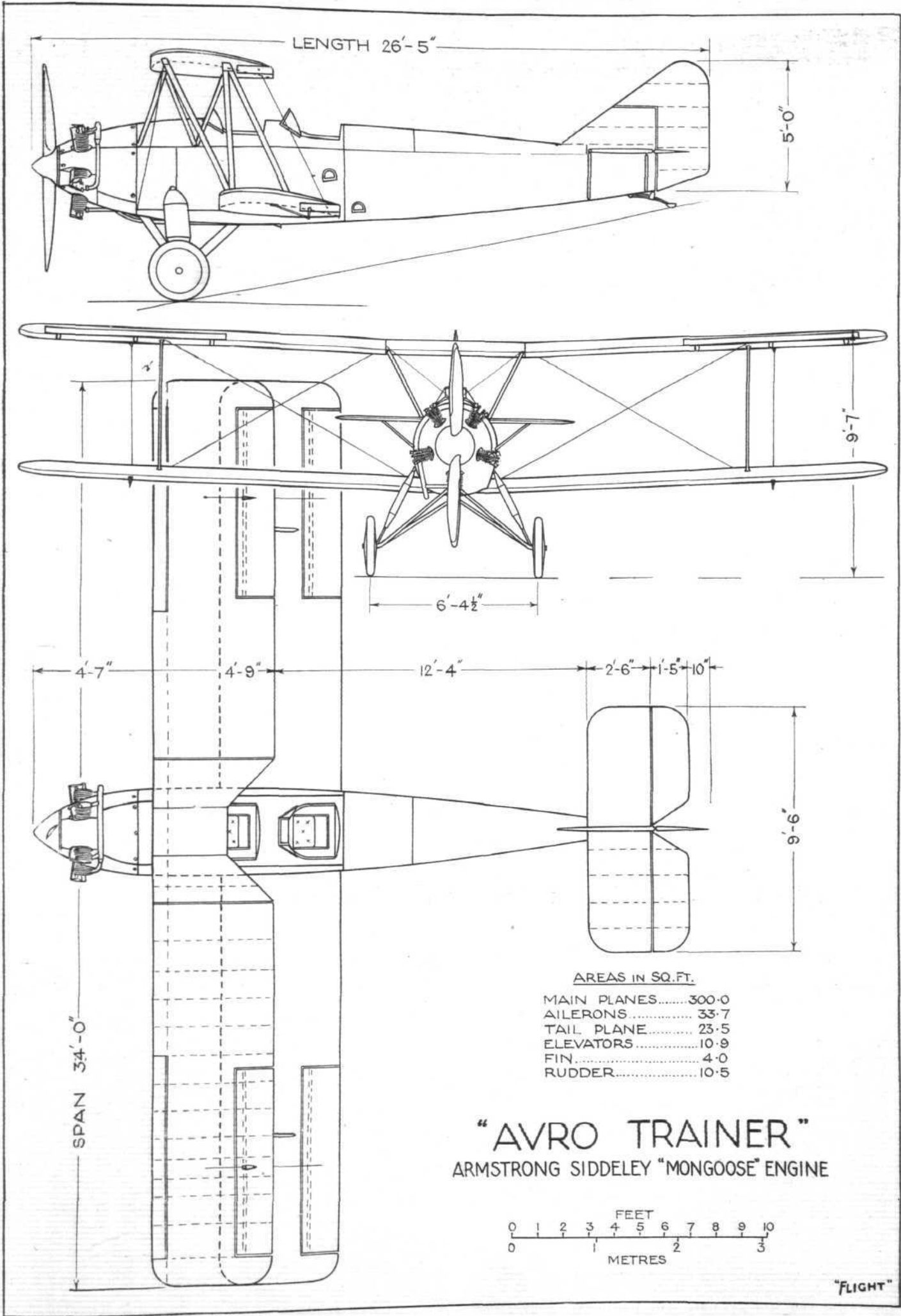
Apart from improvement on Fokker construction in the matter of avoiding welded tension joints, Avros have aimed at greater homogeneity by insisting that all the materials that are to be welded are to have the same chemical composition. Thus the steel used is all of the same composition whether it is in the form of tubes, sheet or bars, and the welded joint is homogeneous except for such reduction in strength adjacent to the weld as is the inevitable result of heating during the welding process. The strength of these welded joints was demonstrated some months ago. A machine having this form of fuselage construction was badly crashed. Several "cartwheels" were made on the ground, and the wreck looked for all the world as if some

giant had taken the machine and screwed it up as one would a bit of paper. The tubes were bent and twisted into all sorts of angles and kinks. But not a single welded joint had fractured. This experience, we believe, tallies exactly with the experience of the Fokker works of Amsterdam, who always claim that everything else may break, but the welded joint will remain intact if the welding operation has been properly carried out.

Uniform stress is not easy of attainment in any aircraft structure, and the welded tube fuselage is no exception. In the *Trainer*, however, an approach towards it has been made by having the longerons of three different diameters, largest in front, medium from cockpits to about halfway towards the tail, and smallest in the tail end. The smaller tube is inserted a short distance into the larger, and the joint is then welded. In the rear portion the typical Fokker type of structure is found only in the top and bottom bays, where small tubular quadrants are welded into the corners and the bays braced by a single wire looped over the quadrants and tensioned by a single turnbuckle. The side panels are strut braced by welded-in struts running from the lower



Welded steel tube construction is employed in the tail unit of the "Avro Trainer." The tail skid is a leaf spring, carrying a chilled cast-iron shoe.

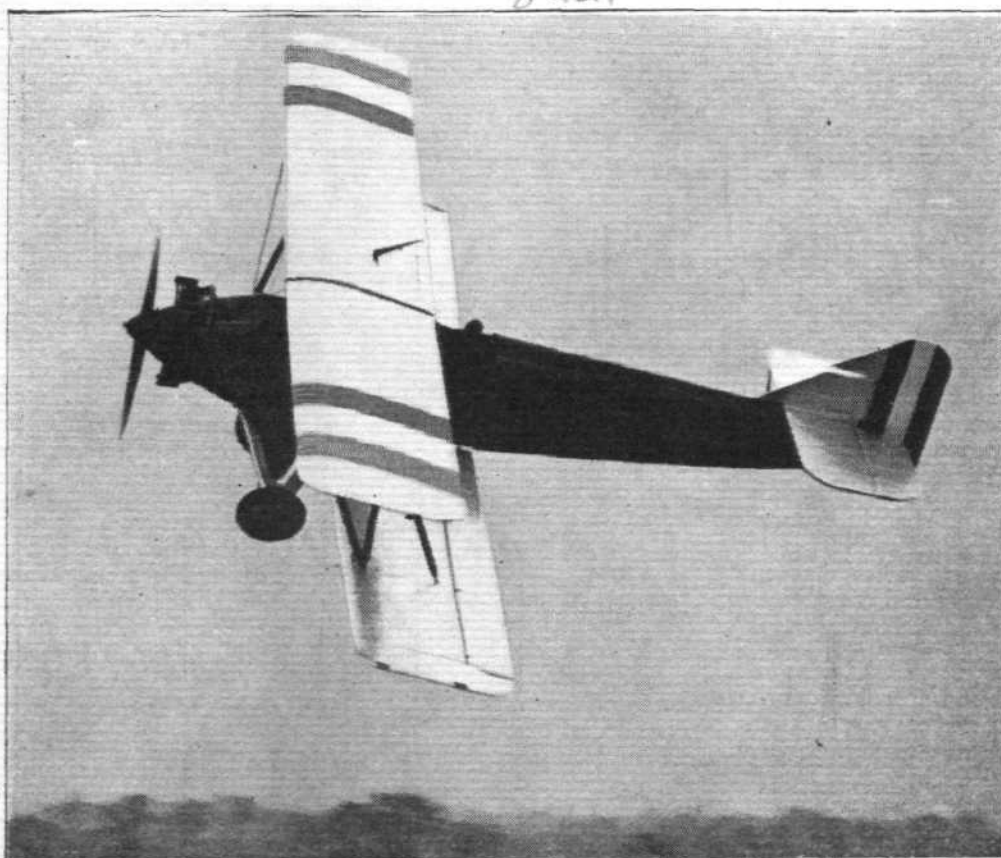


THE "AVRO TRAINER": General Arrangement Drawings. The Engine fitted as standard is a "Mongoose," but if desired a "Lynx" can be installed instead.

8564



8441



THE "AVRO TRAINER": The front view above gives a good idea of the wide track of the undercarriage. Below, the "Avro Trainer" in flight at Woodford Aerodrome. (FLIGHT Photos.)

front corner of the panel to the upper rear corner. In the forward portion the strutting varies slightly, its arrangement being influenced by the fact that various weights, such as seats, controls, &c., have to be carried. For example, if it is found that the diagonal strut of a particular bay would not provide a support in the exact position in which it is required, the strut, instead of being plain straight, is given a "nick" in one side at the point where the support is desired to fall. The strut is then bent over to the required (usually fairly small) angle, and a second, shorter, strut is welded to it at the bend, the other being welded to one of the other corners so as to brace the bent strut. The explanation is a good deal more complicated than the actual job!

In one bay at least, the front one, the diagonal struts are duplicated, not by placing two side by side but by crossing them at their centre, the free ends running to the four corners of the panel. The centre of the x thus formed serves as a support for the telescopic strut of the undercarriage. The welded joint at this point is reinforced with fingerplates, as shown in one of our sketches.

On the front cross strut of the fuselage (i.e., the strut at

the bottom of the fireproof bulkhead) occurs a joint which would be practically impossible with any form of jointing other than welding. The apices of no less than three Vees meet at this point on the centre of the strut; a horizontal Vee of the bottom panel, a diagonal Vee, and a vertical Vee of the front vertical panel of the fuselage. Illustrations cannot convey the quality of welding demanded for such a joint to be possible, but Fig. 10 shows the formation of the joint. Six struts meet the centre of the horizontal member at various angles!

As is usual with metal fuselages, fairings are fitted over the main structure to carry the fabric covering in such a manner as to prevent it from touching the upright struts and thus form unsightly ridges. On the *Trainer* the fairings are somewhat unusual in that they are not light secondary structures permanently attached to the main structure, but units which can be easily removed to expose the main framework. These fairings are of wood, and the clips employed for attaching them to the longerons are particularly neat, as shown in the sketch, Fig. 14. The fairings of the rear portion of the fuselage

8558



The Nose of the "Avro Trainer" fitted with "Mongoose" engine. (FLIGHT Photo.)

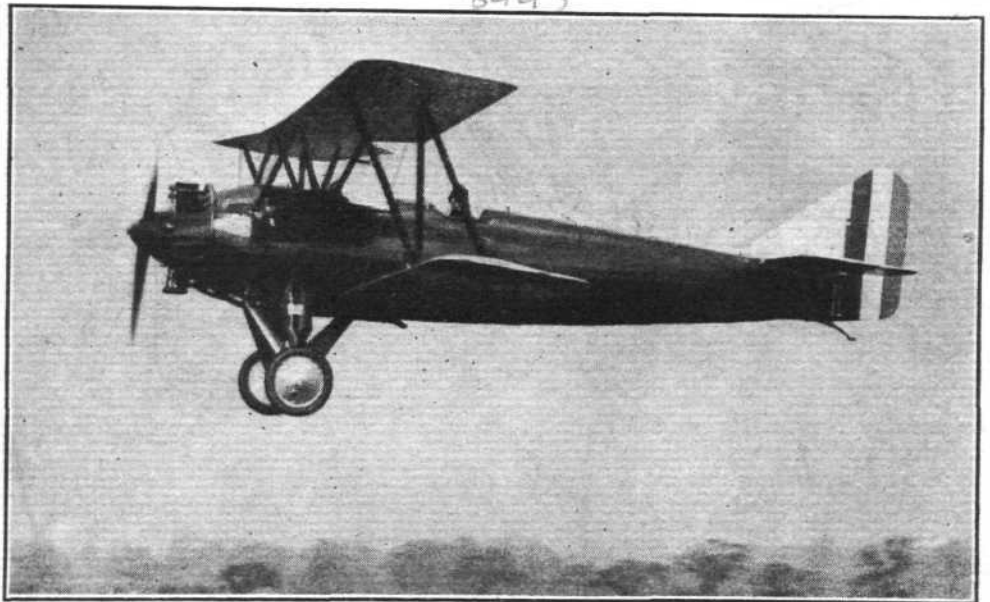
8560



THE "AVRO TRAINER": In this three-quarter rear view, possibility of jumping by parachute from either cockpit is well brought out. Below, the machine in flight. (FLIGHT Photos.)

are not intended to be frequently detached, and thus are secured by the clips referred to. They are, however, built as units, on jigs, and not assembled on the machine. In the forward part the fairings are secured to the fuselage by quickly-detachable fittings in the form of pegs and "safety pins." These units can be removed in a few seconds, and the fuselage structure, etc., is then open to close inspection.

At the forward end the fuselage terminates in a fireproof bulkhead which carries on its forward side the mounting for the engine. At the rear the fuselage sternpost is formed by two vertical tubes side by side but slightly spaced laterally. These two tubes are welded to the longerons top and bottom, and carry on brackets the spindles for the worm of the tail plane trimming gear. The rear ends of the



8559



An alternative power plant. The "Avro Trainer" fitted with "Lynx" engine. (FLIGHT Photo.)

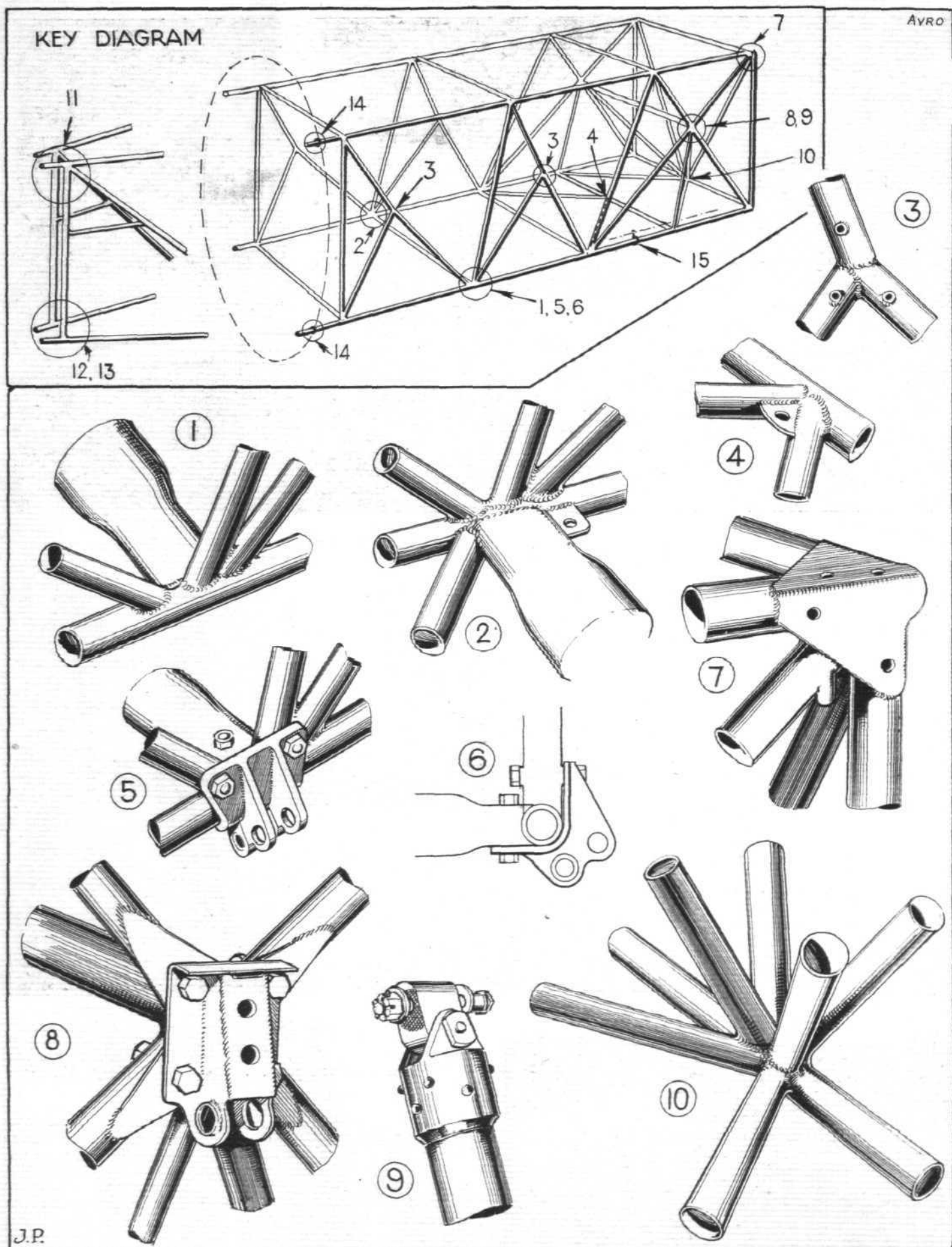
longerons themselves carry two split collars, one at the top and one at the bottom, which clamp tightly and secure the vertical tube of the fin. To this tube is hinged the main tube of the rudder.

The Wings

As already mentioned, the wings of the Avro Trainer are of all-metal construction with exception of the fabric covering. The wing section is one of the "generated" type, with an almost stationary centre of pressure, *i.e.*, with its centre line having a slight reflex curvature. The main wing spars are of high-tensile steel strip, and consist of a single web and two bulbous booms, riveted to the web by "pop rivets." The spar section and construction are illustrated by sketches.

The present Avro procedure in building steel spars is to purchase the strip already heat treated, and to form the bulbous booms, corrugated web, etc., by rolling. Owing to the greater "spring-back" of the hardened strip, the rolling process is perhaps slightly more difficult than is the rolling of the softer strip, but the necessary plant for heat treatment is saved. The Avro type of spar appears to be a very simple affair to manufacture, consisting of but three separate strips, and the number of rivets required is relatively small.

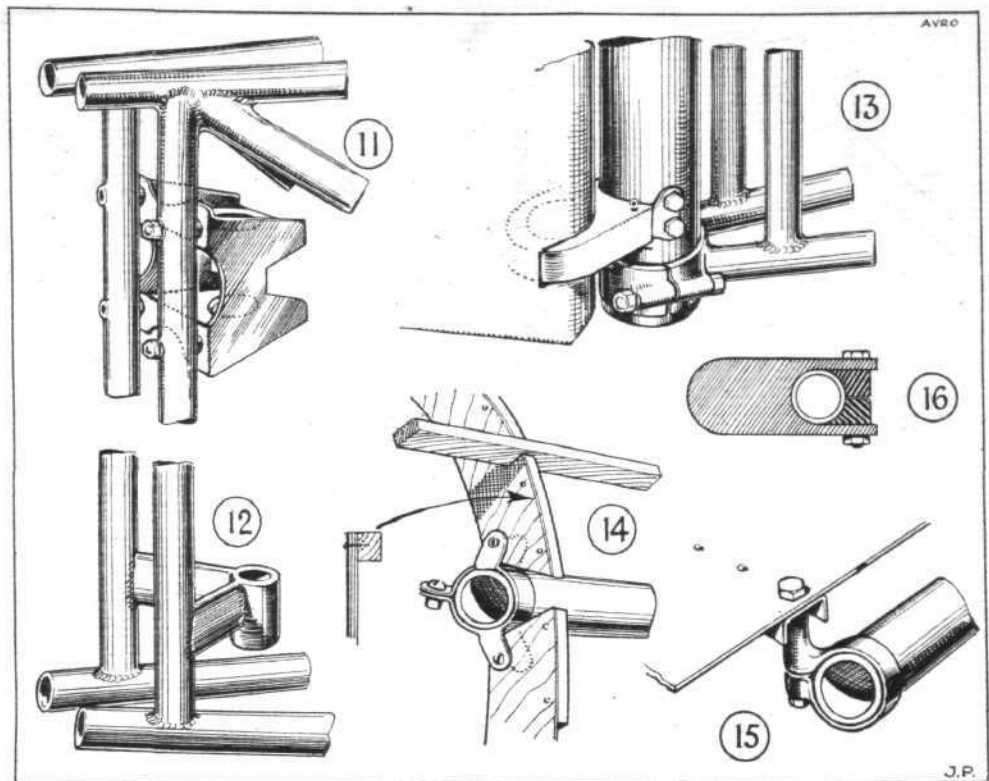
The attachment of interplane struts, wing-bracing wires, etc., to a metal spar is always something of a problem. In the Avro Trainer the strut attachment is simple, consisting



THE "AVRO TRAINER": Some constructional details of the fuselage. The locations of the different joints, etc., are shown in the key diagram. Figs. 1 and 2 are "inside" and "outside" views of the cross-tube joint on lower longeron at point where wing spar is attached. The cross-tube is reinforced internally. Fig. 3 shows a "Y" joint, formed by giving the main tube a "nick," bending and welding it, and welding to the joint a second tube to steady the first at the bend. Another welded joint is shown in 4. Figs. 5 and 6 show the lug (forging) by means of which the lower wing spars are attached to the lower longeron. This lug is attached to joints shown in 1 and 2. The joint at the top front corner of the fuselage is illustrated in 7. The fireproof bulkhead and engine mounting is attached here. The telescopic leg of the undercarriage is attached to the point of intersection of two crossed tubes, by the form of lug shown in 8, the top of the undercarriage leg itself being shown in 9. On the bottom cross-tube in the front of the fuselage the apices of no less than three vees meet in a welded joint as shown in 10. (FLIGHT Copyright Sketches.)

MORE "AVRO TRAINER" FUSELAGE DETAILS: 11, 12, and 13 are dissected views of the sternpost, which is formed by two vertical tubes. The upper fitting for the tail trimming gear worm and wheel is shown in 11, and the lower, welded-on bracket at 12. To the ends of the longerons are welded split collars which carry the fin post, as shown in 13. The rudder is hinged to the fin post and carried on ball bearings. The casings over these bearings contain shaped felt pads soaked in lubricant. The wooden fairings are attached to the longerons by neat clips, as shown in 14. The Duralumin floor of the cockpit is supported as in 15. Lighter controls such as throttles, tail trimming gear, etc., are mounted on the fuselage tubes by a neat clip like that illustrated in 16.

(FLIGHT Sketches.)



of a plate on each side of the spars, and a saddle piece on top of the spar as shown in Figs. 21 and 22. Liners are inserted in the booms at these points to receive the necessary bolts, etc. The ribs are one-piece pressings, and the shape of one of the lightening holes, that immediately behind the rear spar, is so chosen that the tail end of the standard rib can be used as the Frise aileron rib. The method of mounting the Frise ailerons is rather neat. A bracket on the rear spar carries a short length of oval section tube, which projects horizontally rearwards. The ball bearing hinge on the aileron carries a similar forwardly-projecting arm of oval section. This is, however, slightly smaller than the tube attached to the rear spar, so that it enters the latter in the form of a telescopic joint. On assembly the exact distance between leading edge of Frise aileron and rear spar can thus be chosen and the telescopic tubes bolted together, with the assurance that the clearance between wing and aileron is exactly that desired.

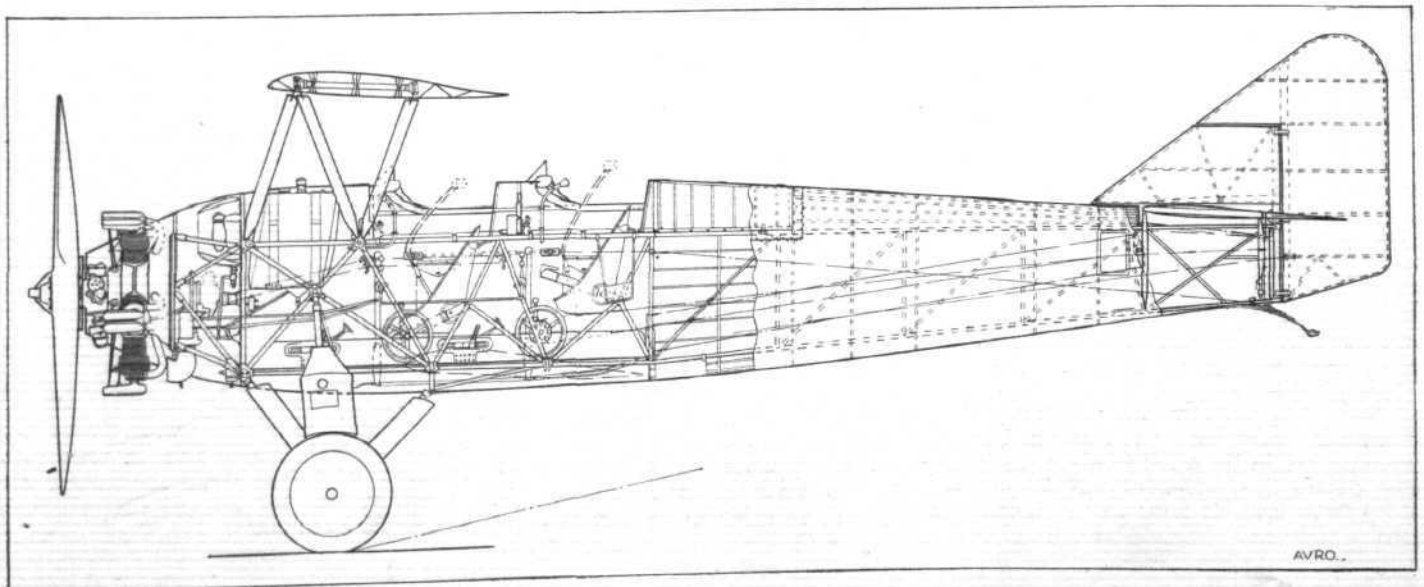
The attachment of the lower wings to the fuselage is by means of drop forgings of the shape illustrated in one of our sketches. The cross tube of the fuselage at this point is reinforced, and tensile stresses are transmitted from the wing lug to the cross tube without stressing the welded joint. The fittings carry lugs for the attachment of the seaplane undercarriage struts.

The undercarriage of the Avro Trainer is of wide track,

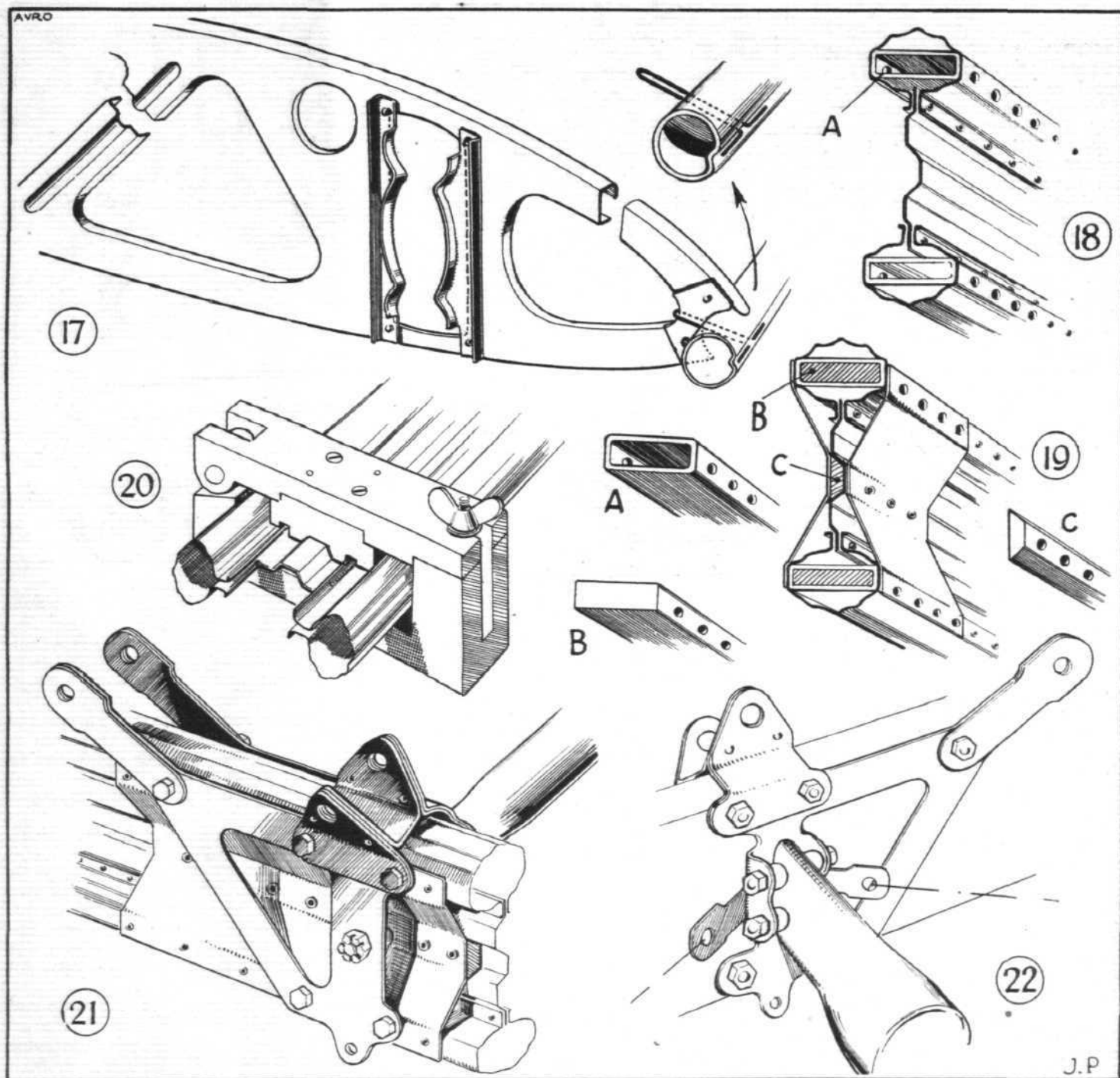
and although not quite as "squashy" as the undercarriage of the 504, still has a long travel and good shock-absorbing qualities. The telescopic legs, with compression rubbers and oil damping, are stiff enough to let a pupil know when he has made a bad landing, although probably no damage will be done to the machine. The old 504 undercarriage is so flexible that a pupil may easily make quite a bad landing without being aware that he has done so. The tail skid is non-swivelling, and consists of a leaf spring carrying a cast-iron shoe.

Like the fuselage, the tail surfaces are made of welded steel tube. The tail plane is provided with a worm and wheel trimming gear, but extra range of adjustment is obtained by providing the tailplane leading edge with two short vertical stubs which rest in sockets on the top longerons. By means of holes drilled through stubs and sockets, the tailplane angle can be adjusted, when the machine is on the ground, within wide limits, the trimming of the rear spar not being affected.

The Armstrong-Siddeley "Mongoose" is the standard power plant, but if the machine is required for work from an aerodrome situated at a considerable altitude, an Armstrong-Siddeley "Lynx" can be fitted instead. The engine is supported on a tubular structure from the four front corners of the fuselage, from which it is isolated by a fireproof bulkhead. The engine ring itself is of channel section. The



THE "AVRO TRAINER": This part-sectioned Side Elevation shows the general characteristics of the structure and the placing of seats, etc.



THE "AVRO TRAINER": Some wing details. The rib construction is illustrated in 17. A main spar section is shown in 18. Note the flattened tube and aluminium block reinforcement of the spar booms for attachment of interplane strut fittings. Further details of this are also shown in 21 and 22. In Fig. 20 is shown one of the jigs used while riveting up the spars. (FLIGHT Sketches.)

petrol tank (of 30 gallons capacity) is mounted in the deck fairing, which position is high enough to give direct gravity feed.

Layout of Cockpits

Very great care has been taken in planning the layout of the cockpits. Both are not only identical in size, but the controls, instrument arrangement, etc., are the same in both, so that a pupil changing from one cockpit to another will at once feel at home, and will not be in danger of having to fumble about, in an emergency, for any control or switch. Owing to the heavy stagger of the wings, both cockpits are well clear, and both occupants have a good chance of using their parachutes.

The cockpit floors are of Duralumin, and the controls, with the exception of the actual joy sticks and foot bars, are covered in by a tunnel-shaped raising of the floor, along the centre line. Behind the aft cockpit there is a slight drop from cockpit floor to the bottom fairing, so that any dirt which has collected can be swept along and dropped through a small trapdoor.

The inside of the fuselage structure is lined with leatherette and only a few controls, etc., project through this into the cockpits, so that the latter are entirely without that con-

glomeration of struts and other structure members which has been the rule in cockpits of aeroplanes hitherto. At the same time the detachable fuselage fairings enable the structure to be examined quite readily whenever it is desired to do so.

The controls are of normal type, but a very neat adjustment is provided for the foot bars to suit pilots of different heights. This adjustment, made by means of a small wheel operating a worm, can be made during flight quite easily. Of controls which are not quite standard yet, reference may be made to the locking arrangement of the Handley Page slots. A sliding bolt arrangement on the starboard side enables the instructor to lock the slots and to unlock them again during flight.

An exhaust heated cockpit is a boon for work in winter, or for flying at considerable altitudes, and in the Avro Trainer this takes the form of a duct along the side of the control tunnel on the floor, the hot air entering through openings near the feet of the occupants.

Altogether the Avro Trainer is an exceptionally interesting machine, and carefully thought out for the work it has to perform. Whether it is the successor to the 504 time alone will show. It starts with very good prospects of taking the place of its famous ancestor.

THE KING'S CUP

THE following are the Supplementary Regulations for the King's Cup Air Race, which takes place on July 5, starting and finishing at Hanworth Park, Feltham, London.

Organisation.—The race will be conducted by the Royal Aero Club under the regulations of the F.A.I. and the Competition Rules of the Royal Aero Club.

Competitors.—The entrant and pilot or pilots must be British subjects. The entrant must be an individual, and not a company.

Aircraft.—The race is open to any type of *bona-fide* civil aircraft. The aircraft, including the engine or engines, must have been entirely constructed in the British Empire. For the purposes of the race, a *bona-fide* civil aircraft is an aircraft which was originally designed and subsequently constructed for use in civil aviation activities. In any question regarding the eligibility of any aircraft, the decision of the Royal Aero Club shall be final.

Entries.—The entry fee is £5. This fee, together with the entry form complete with all particulars duly filled in, must be received by the Royal Aero Club, 3, Clifford Street, London, W.1, not later than 5 p.m. on Friday, June 6, 1930. Late entries will be received up till noon, Friday, June 13, at a fee of £10. The entrant is responsible for the accuracy of all particulars supplied by him to the club relating to aircraft and engine. The officials may require the entrant, at his own expense, to submit the aircraft, including the engine or engines or any part thereof, for examination, in order to verify these particulars. The Royal Aero Club reserves the right to refuse any entry without assigning any reason.

Air Navigation Regulations.—Competitors must comply with the Air Navigation Regulations in force, subject to any concessions which may be made by the Air Ministry for the race.

Certificate of Airworthiness.—The following certificate must be obtained and produced to the Royal Aero Club one week before the date of the race:—

An Airworthiness Certificate of either the normal or aerobatic category in respect of any one of the sub-divisions (a) to (e) inclusive. The aircraft must be equipped with an engine which is classified as belonging to the normal category of engines.

Course.—The course will be approximately 750 miles, starting and finishing at Hanworth Aerodrome, and must be completed by 10 p.m. on the day of the race.

London (Hanworth Park)	..	..	Start.
Hamble (turning point)	..	..	56½ miles.
Bristol (control)	..	..	66½ "
Castle Bromwich (turning point)	..	..	83 "
Hooton Park (turning point)	..	..	72½ "
Manchester (control)	..	..	25½ "
Woodford (turning point)	..	..	13½ "
Sherburn (turning point)	..	..	49½ "
Newcastle (control)	..	..	91½ "
Hull (control)	..	..	109 "
Leicester (turning point)	..	..	91½ "
Hanworth Park (finish)	..	..	89½ "
Total	..	..	749½ "

Handicap.—The aircraft will be handicapped for the complete circuit according to estimated performances. The minimum speed at which aircraft will be handicapped will be 80 m.p.h.

Competitors will be started from London in accordance with their handicap.

The Royal Aero Club reserves the right to adjust handicap allowances following the inspection of the competing aircraft.

Prizes.—His Majesty the King—The King's Cup; The Rt. Hon. Lord Wakefield of Hythe, £500. Additional prizes will be announced later. A special cash prize will be awarded for the best performance in the King's Cup Race on a handicap calculated according to the following formula:—

$$V = K^3 \sqrt{\frac{\text{B.H.P.}}{S^2}}$$

when V = Handicapping speed in m.p.h. K = constant = 290, B.H.P. = Brake horse-power of the "Type" engine at maximum permissible r.p.m. S = "Equivalent wing span" of the aircraft in feet. For a monoplane, S = wing span; for a biplane with upper and lower wings of equal span, S = 1.265 (wing span); for a biplane with upper and lower wings of different spans, S = S₁ + 0.265 S₂, where S₁ = greater span and S₂ = lesser span.

CROYDON WEEKLY NOTES

CROYDON Aerodrome is a hive of activity now that the summer services are coming into operation, and night flying is in full swing.

A Sabina machine departs for Brussels at 0100 hr., another Sabina machine arrives from Brussels at about 0200 hr. An Air Union machine arrives from Paris at about 0330 hr., and a Deutsche Luft Hansa aeroplane departs for Cologne and Berlin at the same hour—and there are promises of more to follow—so the Control Tower Staff have a pretty busy time, and are now on what practically amounts to a continuous 24-hour watch. Thursday, April 17, saw the beginning of the Easter Exodus, for, in addition to many Air Line specials, no less than twenty light planes left Heston for Brussels, etc.

Sixty machines were dealt with on Thursday, and forty machines on Friday.

Owing to the selfish neglect on the part of many private owners to conform to regulations by circling French coastal stations, and reporting their arrival at their destinations, the Control Tower, Duty Officer and wireless staff were put to the greatest trouble and confusion. When will some of these private owners realise that in disregarding these regulations which have been carefully thought out and framed for their own especial safety, they are endangering their professional brother pilots, who on large commercial machines with, perhaps, twenty passengers, may be endeavouring to send wireless messages on account of real trouble, only

to find themselves jammed out by wireless stations making all sorts of unnecessary enquiries respecting a supposedly missing light 'plane which has not circled their station.

The number of fruitless broadcasts that have been sent out to the shipping and coastguards, etc., in this connection is enough to raise the cry of "Wolf."—Delinquents, kindly note your own selfishness may endanger life.

Saturday, April 19, 0830 hr. saw the Indian Mail off, GEBLF, piloted by O. P. Jones, and at the time of writing the inward Indian Mail machine GEBLO, piloted by Roges, is at Cologne, and will arrive at Croydon this afternoon (Tuesday, April 22).

On Easter Monday GEBLJ, piloted by "All-Weather" Mackintosh, with engineer "Jenks," departed at 0815 for Rome, with Sir Henry Segrave as passenger. Mr. Trost's (Air express) Junker Junior Genet, has been putting up some wonderful aerobatics under the superb piloting of Major "Nobbie" Clarke. This seems to be an ideal light plane for the private owner, as the pilot has a perfect unobstructed view all round, and she is a little gem to fly—light as a feather. No hangar is required, and there is no rigging to be done. Just a little engine upkeep, that's all. It's years ahead of its time. The sky is thick with remarkable little Desoutter monoplanes. What a wonderful alliance of old 1912 timers—"Marcel" and "Hardy." It makes one feel quite young to see them together.

It is hoped that the Duchess of Bedford, with Capt. Barnard and Mr. R. Little, will be able to attend.

Lord Thomson

It was announced in the *London Gazette* of April 24 that Col. (Hon. Brigadier-General) Lord Thomson, having attained the age limit of liability to recall, ceases to belong to the Reserve of Officers.

Air League Comes of Age

A DINNER and dance will be held at the May Fair Hotel, W., on May 7 to celebrate the coming-of-age of the Air League of the British Empire. Sir Alan Anderson will preside. The speakers will include Sir Samuel Hoare, Lieut.-Col. J. T. C. Moore-Brabazon, the Master of Sempill, Captain F. E. Guest, and Mr. P. J. H. Hannon, M.P.

PRIVATE FLYING AND CLUB NEWS

BRISTOL AIR PAGEANT.
MAY 31.—As a large number of machines are expected to attend the Bristol Air Pageant, the organisers, in the interests of safety, intend to insist upon a strict system of flying control.

As well as "Instructions for Competitors," all of whom have to be at the Bristol airport by midday, Friday, May 30, "Instructions for Visiting Pilots" will also be issued and will be published later in this paper; meanwhile they can be obtained on application from the Manager, the Bristol Airport, Bristol.

These instructions are especially for those arriving at the airport on the day of the Pageant, Saturday, May 31, and will give particulars of the general regulations applying to all, including actual competitors.

All pilots visiting the Bristol airport for the pageant may obtain special terms for Friday and/or Saturday nights, May 30 and 31, if early application is made to the Manager, the Bristol Airport, who will reserve rooms on behalf of the applicant at, first of all, the Grand Hotel, then the Royal Hotel, and then the Spa Hotel, for 16s. per night for a single room, inclusive of dinner and breakfast.

It will greatly assist the organisation if all those definitely requiring reservations will advise the manager of the Bristol airport as soon as possible.

THE CINQUE PORTS FLYING CLUB put in, for week ending Saturday, April 19, 15 hr. 30 min. flying time. Of this, 7 hr. was dual instruction, 6 hr. "A" pilots' solos;



THE PRÜFLING : Mr. Alan Goodfellow flying the Lancashire Club's new glider.

were forced to return owing to bad weather after reaching Maidstone, but during the afternoon they managed to get through, only to find that the meeting was abandoned owing to the prevailing snowstorm. They returned on Sunday, and on Monday attended the N.F.S. meeting at Hanworth.

A new member who commenced flying during the week was Mr. G. H. Walpole, an "A" licence pilot trained by the Brooklands School of Flying.

THE ISLE OF WIGHT FLYING CLUB has been started at the Aerodrome, Shanklin, with Mr. A. G. Murray as secretary.

The club has already secured several pupils and is in daily use. The immediate intention is to teach pupils at a cost, to them, of £30, up to the time when they can secure their "A" certificate, and there is a scheme by which payment of this fee may be made by instalments. A small club-house has been built on the aerodrome, where tea and

and tests, etc., took up the remaining 1 hr. 10 min.

Wind and rain stopped flying on Wednesday and Friday and allowed only 40 min. on Thursday, so that the total of 15 hr. 30 min. is good for three days' work.

On Thursday, Mr. G. Story, of Hythe, flew his Moth G-EBTZ from Baldonnell, near Dublin, to Heston, London, crossing direct, and covering just over 100 miles of water in just under an hour. On Friday he came on to Lympne, and on Saturday flew with Mr. H. E. Thwaites to the Leicester Flying Meeting. On their first attempt in the morning, they



POTENTIALITY : The De Havilland Co.'s new aerodrome at Hatfield. (Flight Photo.)



SPAIN : Prince Alfonso who has just got his pilot's ticket at Cuatro Vientos Aerodrome. (Photopress.)



INDIA : Mr. R. N. Chawla, the first Indian pilot to fly from India to England. (FLIGHT Photo.)

light refreshments may be obtained, and as the situation is just above Shanklin, it should prove an attractive spot for all aviators.

At the moment one Moth and one Avro are in action, and it is hoped to have two more machines on the aerodrome during the summer.

It is proposed to hold an air pageant on June 12, which Sir Sefton Brancker has kindly consented to attend, if possible.

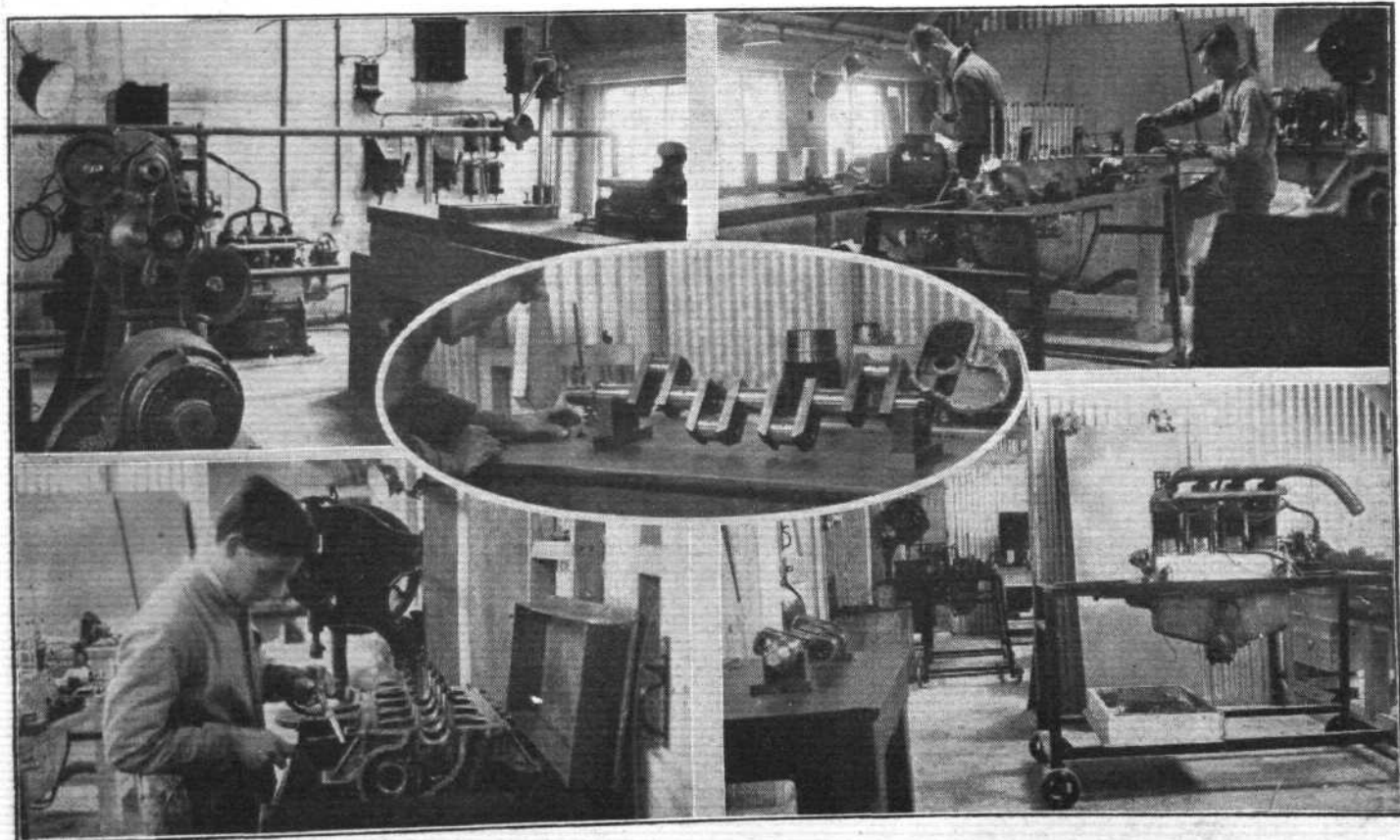
THE YORKSHIRE AIR PAGEANT will take place at Sherburn-in-Elmet on May 10, and N.F.S. are working hard to make this a really good meeting.

They state that an impression seems to be growing up that they offer a less cordial welcome to private owners than

do the independent clubs. Nothing is further from the truth. Their organisation is rather different, that is all. As a commercial organisation with shareholders to satisfy, they cannot exercise the same degree of hospitality, but their welcome to private owners is none the less friendly, and they will be very pleased to receive suggestions from them with a view to increasing the interest of flying as a sport and adding to the enjoyment and comfort of all who attend the meetings.

A sore point appears to be that they have charged landing fees to visiting aircraft at their pageants. Actually, they say, they have never done so, unless perhaps by accident, and they have now decided to waive housing fees also, on pageant days.

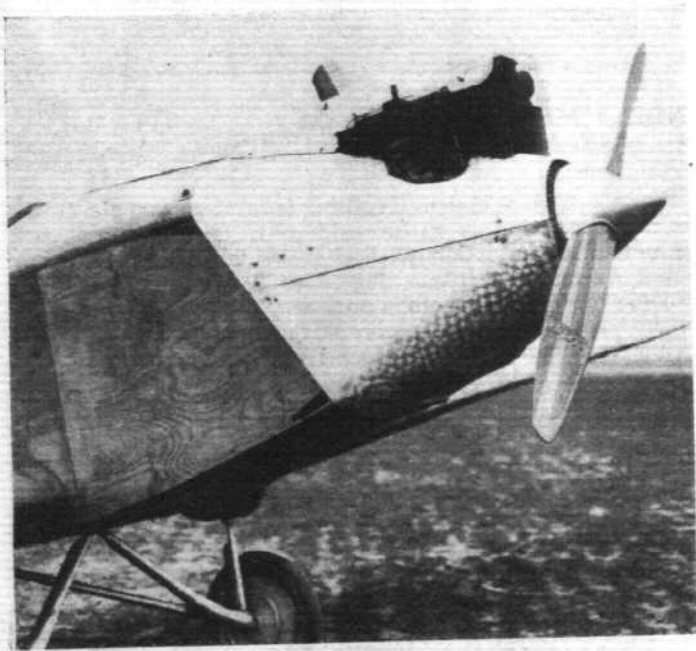
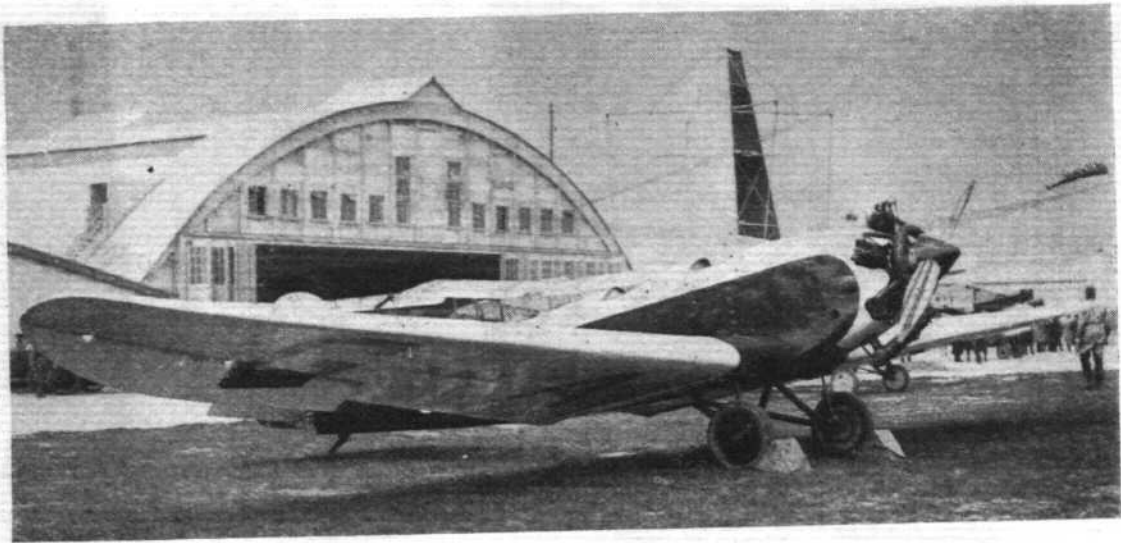
Will readers kindly note an alteration in the date of the



ENGINE MAINTENANCE : Some views of the new shops at Heston, where Airwork, Ltd., overhaul engines. (FLIGHT Photo.)

KLEMM TYPES :
Above is the new
Siemens - Klemm be-
longing to Mr. R.
Denman and below, on
the right, is the nose of
the same machine, and
on the left is a Klemm
with a Cirrus III.

(FLIGHT Photos.)



Nottingham Aero Club Pageant. This will take place on Thursday, June 19, instead of Sunday, June 15, in order to meet the wishes of local residents.

The programme at Sherburn will include :—

THE YORKSHIRE AIR RACE, for private aircraft owners, over a course of 30 miles, crossing the aerodrome on each lap. Two prizes, a cup and another to be announced later, will be awarded.

PARADE AND FLY PAST of various types of aircraft.

DEMONSTRATION OF THE AUTOGIRO.
BALLOON BURSTING COMPETITION.
DISPLAY OF AEROBATICS.

DEMONSTRATION OF THE COMPER "SWIFT."

AEROBATIC DEMONSTRATION OF THE DESOUTTER.

An "ALL FORMS OF TRANSPORT" RACE, as at Hanworth.

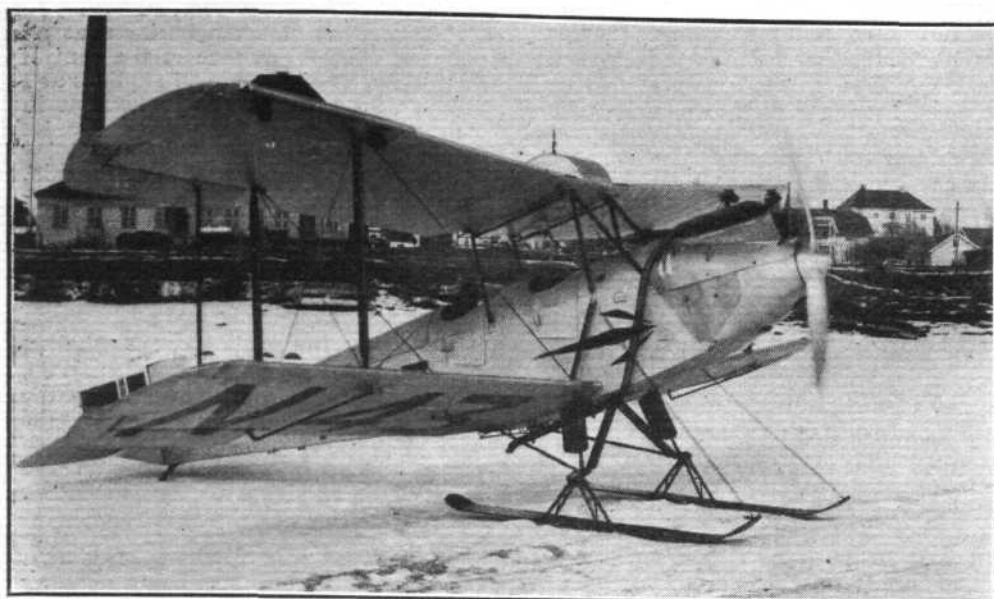
DISPLAY OF INDIVIDUAL AEROBATICS.

"DESTRUCTION OF THE LEVEL CROSSING," and, finally, a PARACHUTE DESCENT FROM DESOUTTER.



A KLEMM VISIT : Mr. Muntz with some of the party on the tour from Heston during a visit to the Klemm works at Böblingen.

(Photo. R. Poebel.)



A SPARTAN SPARTAN The first Spartan to be fitted with skis, in Norway.

THE GIPSY TWO engine is officially approved as air-worthy in the Normal Category for use in civil aircraft under Air Navigation Regulations and Directions.

In this category type tests were carried out during the February of this year at a rating of 105 b.h.p. at 2,000 r.p.m. at sea level.

THE GLIDER shown below has a gliding angle of 1 in 15, flying speed 30 miles per hour giving a sinking speed of 2 miles per hour. A southerly wind of 20 miles per hour velocity gives an up current with a velocity of 4 miles per hour on the Club's gliding ground at "The Clive," Pattingham. The Ridge on which the gliding ground is situated extends approximately 3 miles.

BROOKLANDS SCHOOL OF FLYING.—The flying hours of the school during the last four weeks amounted to 118. During this period part has been taken in the production of a film, the school supplying the machines and pilots. Several new pupils have been enrolled. The Hon. Mrs. Westenra and Mr. Henslow completed their tests for "A" Licence.

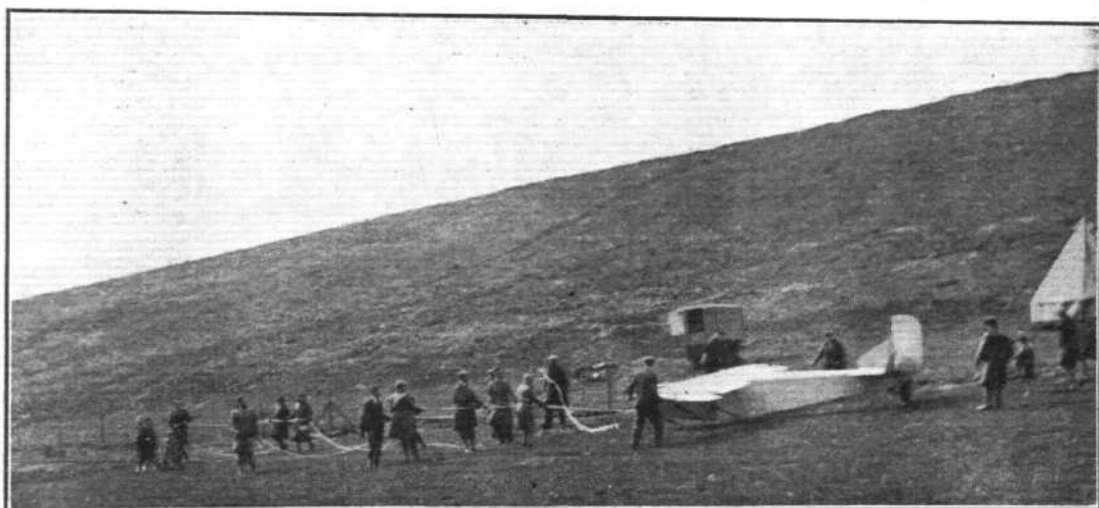
On the evening of April 26 the school turned out in force

EASTER MONDAY was the first anniversary of the Phillips and Powis School of Flying.

Starting with one Mark I Moth, the School has developed to such an extent that eight Mark II and Gipsy Moths are now in commission.

300 pupils have taken instruction and 16 "A" licences obtained, whilst at least six others have completed solo flights and are ready to pass their test.

A MIDLAND GLIDER: The Glider of the Midland Club about to be launched.



to bid Godspeed to Messrs. Bharucha and Leathes who have set off on the latter's Moth for Kenya. They are both pupils of the School and we trust they will complete the journey safely. Mr. Bharucha joined the School about a year ago, since when he has obtained his pilot's "B" Licence and all his Ground Engineer's Licences.

Mr. Murray flew his S.E.5.A. for the first time on April 27. He lived up to his reputation by flying in his usual perfect style.

Joy riding has now started at Runnymede and Clacton.

Hours flown for the year total 1,200, a number which it is hoped to exceed during the coming year, in view of flying rates being reduced to £2 an hour.

Mr. W. S. Giddy is the Chief Instructor and Mr. J. H. A. Wells assistant. In addition to instruction work the School is open for aerial work of all kinds—pleasure flying and taxi work. The Company also runs an efficient workshop capable of undertaking all types of aircraft repairs, and a Sales Department which has been successful in disposing of several new and secondhand light aeroplanes.



A READING SCHOOL: The photo shows six of the Phillips and Powis machines lined up at Reading.

A "SPARTAN" fitted with skis is now operating in Norway. Purchased by Mr. Omsted, it is used for advertising purposes. The machine is the standard two-seater model with Cirrus-Hermes engines, the ski undercarriage being made in Norway and being readily interchangeable with a float undercarriage.

FOURTH ASHWELL-COOKE Challenge Cup Competition. The next competition will be held at 1530 hours on Sunday, May 4, when it is hoped to have a large attendance and many competitors. This competition is of the greatest value and we hope that many private owners will take part.

THE MODEL AIRCRAFT CLUB. This Club has shown great interest in full-sized gliders. It has, therefore, been decided to form a gliding section. All interested should write to Mr. John Welding, 404a King's Road, Chelsea, S.W.5, who has undertaken the organisation.

THE D. W. AIRCRAFT CO., whom, as we announced last week, have recently built a machine, the D.W.2, which should prove admirable for training purposes, are shortly moving to the old aerodrome at Ford near Bognor. A school will be formed and the new machine built which, as it becomes available will be used for instruction in preference to Avros or other light aircraft. F/O. W. A. Rollason has now joined the firm and will be in charge of the flying side and will organise the school on arrival at Ford.

COL. G. L. P. HENDERSON is starting business as an aviation agent, and has opened an office in the central hall at Croydon. He will act as agent for all air lines and air taxi concerns, and is also taking a large interest in gliding.

THE SCOTTISH FLYING CLUB got in 89 hr. 35 min. flying during March, which is an achievement, as only 13 days could be called reasonable flying days. The weather was particularly bad and snow, fog and gales were common. 37 hr. 5 min. were dual instruction and 40 hr. 30 min. were flown solo. Messrs. Patrick and Allan gained their "A" licences, and Miss Walter went solo.

The "City of Glasgow," an Imperial Airways Argosy, will pay a three days' visit to Renfrew on May 24, 25 and 26, and a programme of flying events has been arranged by the club to coincide with these dates. The Argosy will take up passengers, and the programme will include parachute drops, aerobatic displays, balloon bursting, races and the "Autogiro." Members will be admitted to the aerodrome free on production of their 1930 membership cards.

WING-COMMANDER G. PRETYMAN, who is in aviation business at 8, Old Bond Street, will be holding an aerial at home at Shoreham on Sunday, May 4, in connection with the Brighton Horse Show.



COMMERCIAL PRODUCTION : A batch of Desoutter cabin aircraft ready for delivery at Croydon.

GRAF ZEPPELIN VISITS ENGLAND

(Concluded from page 474.)

The third problem was the mechanisation of handling airships on the ground. Many keen brains were working in England, America and Germany on this problem, and when it has been solved one of the greatest difficulties of airship transport would have been conquered.

He saw no possibility in the near future of trans-oceanic traffic for the heavier-than-air craft, but every possibility for the airship. The third problem he had stated was the one which, when mastered, would be of far-reaching importance to mankind, for it would definitely inaugurate the coming of the airship.

There were present at the dinner :—Colonel the Master of Sempill, H.E. the German Ambassador, Herr Dieckhoff, Admiral of the Fleet Sir Charles Madden, Air Vice-Marshal Sir Sefton Brancker, Sir Godfrey Thomas, Rear-Admiral Basil Brooke, Lieut.-Col. V. C. Richmond, Wing-Comdr. T. R. Cave-Brown-Cave, Flight-Lieut. Nixon, Mr. B. N. Wallis, Lieut.-Col. M. O'Gorman, Dr. Gerald Merton, Lieut.-Col. N. G. Thwaites, Mr. G. H. Thompson, Mr. David Boyle, Capt. J. Laurence Pritchard, etc.

Lord Thomson, Secretary of State for Air, also gave a private dinner to Dr. Eckener, at the Ritz Hotel, on April 25.

We had the pleasure of a personal chat with Dr. Eckener. Dr. Eckener, whose visit was in no way official, is a man of courteous and charming manners, just beyond the 60 years. Of striking personality, but modest withal, he hardly

suggests to one the fund of technical knowledge and experience which he possesses. His views, technically and commercially, are distinctly sound. His emphasis upon the internationality of the airship problem confirms the opinion which is now coming to be recognised—there can be no individual or purely national outlook attached to the great advances which airship development is likely to evolve in the next few years. Europe and England will undoubtedly be mainly looked to, he thinks, for some time for the highest grade and most efficient construction and equipment, whilst it is to America that the world will necessarily look for the supply of helium. Each great continent stands to gain by the advance which will ensue upon international freedom of airship transport. Dr. Eckener's plans for serving the great southern section of America as well as the northern section are well conceived, and should demonstrate the practicability of the scheme after his initial voyage in the middle of May has been inaugurated. For finance, the road is clear *via* America, where the successful future of airships is already a conviction amongst the financial magnates. Therefore, Dr. Eckener should find little difficulty in launching his scheme for a regular trans-ocean service. He is enthusiastically pro-British, and has one great ideal—seeing Briton and German co-operating whole-heartedly, thereby helping to overcome economic and other troubles which are at present so afflicting the Western Hemisphere. He is all out for exchange of technical and research data, co-operation in airship routes, without competition, with mooring plans and design to be as far as possible standardised.

THE DUCHESS OF BEDFORD'S BAD LUCK

HAVING successfully accomplished a record flight out from England to Cape Town in ten days, the Duchess of Bedford has experienced an eleventh-hour mishap which has marred an even better record return flight home. It was expected to be able to make the return journey in nine days—and therefore the 18,800-mile out and home flight in 19 days—and it looked as if this would be accomplished, when a minor mishap brought the machine down on the last stage.

None the less, the flight, as it stands, is a most remarkable achievement, and a matter of one day's delay in no way affects the establishment of a record flight.

Although we have recorded the progress of the flight previously, a brief résumé may be repeated here. Firstly, the machine the *Spider*, is a Fokker fitted with a Bristol "Jupiter," and Capt. C. D. Barnard served as first pilot and Mr. Robert Little as second pilot and navigator. The flight commenced at Lympne on April 10, the first stop being Oran. Thence the daily progress was as follows:—

Tunis—Benghazi—Assiut—Khartoum—Juba—Dodma—Broken Hill—Bulawayo—Cape Town (April 19).

The return flight started on April 21, the daily stages being:—Palapye—Bulawayo—Broken Hill—Dodma—Juba—Assiut—Aleppo—Sofia (April 28).

They left Sofia on April 29 for the final stage to Croydon, where they were expected in the evening. Unfortunately, however, twenty minutes after starting a broken oil pump forced them down in a field at Fluinitza, near the frontier. Capt. Barnard proceeded to the railway line nearby and stopped the Simplon express, boarded the train, and reached Dragoman, whence he telephoned to Sofia for assistance.

A Bulgarian aeroplane forthwith flew from Sofia to the stranded *Spider*, and on the extent of the damage being ascertained, returned to Sofia with Mr. Little for the necessary spare parts. These were eventually dispatched with three expert Bulgarian Air Force mechanics, and the *Spider* was taken to Sofia for more thorough repairs.

A fresh start was made on April 30, the necessary repairs, thanks to the sporting efforts of the Bulgarian Air Force, having been effected, and at the time of writing we learn that Croydon was reached at 5.30 in the evening.

AIRISMS FROM THE FOUR WINDS

Air Route to Canada

COL. RALSTON, the Minister of National Defence, addressing the annual banquet of the Aviation League of Canada, declared that the possibilities of a two days' air route between Great Britain and Winnipeg were under consideration by men interested in aviation for Empire transportation. The route contemplated was via Scotland, the Faroe Islands, Iceland, Greenland, and Hudson Bay. A survey of the Ice Cap in Greenland, to find suitable landing places and to study meteorological conditions, would be made during the next twelve months.

S. African King's Cup Entrant

CAPT. DOUGLAS, of the Johannesburg Light Aeroplane Club, who will represent the Aero Club of South Africa in the King's Cup Race, will fly to England in a Junkers five-seater monoplane.

Damage to R100

R 100 was slightly damaged when being taken from her shed at Cardington on April 24. A cross-wind sprang up just before she was clear of the shed, and the outer edge of her starboard elevator scraped against the side of the shed. A thorough examination was made, and it was found that the damage was slight, but in order to carry out the repairs as quickly as possible, the airship would have to be put back in the shed. This was impossible at the time, and she remained at the mooring mast. It is hoped that the new mechanical handling device now being made at Cardington will greatly reduce the risks of such accidents.

Accident in the Sahara

A MESSAGE from Reggan, in the Central Sahara, states that the French airmen, Captain Goulette and M. Marchesseau and M. Bourgeois, who had been missing since they left the Niger at Gao on April 22, have been found in the Kebalalet region, to the south of Reggan, which was to have been their next stopping place. All three airmen were slightly injured, and the machine was completely smashed.

U.S.A.—Hungary Flight

THREE Hungarian airmen, M. Eugene Czapaky, M. George Endresz and M. Steven Grossschmidt hope to win the prize of £2,000 offered by Viscount Rothermere for the first transatlantic flight by an Hungarian from the North American mainland to Budapest. The flight is to be attempted in July from Detroit in the aeroplane "Justice" to Hungary, which has been built in the United States by public subscription among American-Hungarians.

Central Australian Exploration

PLANS have been announced of an expedition to Central Australia by means of the new triple-engined monoplane, Lasconder, built by Australian Aerial Services, Ltd. Mr. Donald Mackay, a New South Wales pastoralist, is bearing the cost of the expedition, which will last five weeks. Included among the *personnel* are Comm. Bennett, formerly in charge of the Admiralty survey of the Great Barrier Reef, Mr. Kingsley Love, a Victorian wireless expert, and Capt. Frank Neale, a pilot of the Camooweal-Daly Waters air mail.

A scientist is also being taken. The Lasconder will leave Melbourne on May 24. The base of the operations will be Ilbilba, in the Ehrenberg ranges, whence flights will be made north, south, and west. The whole area flown (much of which has never been seen by white men) will be photographed. Mr. Mackay has led several expeditions in Australia, New Guinea, and in the Pacific. The trial flight of the Lasconder completed the company's millionth mile of commercial flying without a serious accident, which is claimed to be a world's record.

"Rotary Thumbs"

To be "all thumbs" is not usually a flattering appellation. But in connection with aircraft it seems possible that Dr. A. P. Thurston may change that. It will probably be known to our readers that Dr. Thurston has been carrying out experiments on the effects of small auxiliary aerofoils, which he calls alulas, placed in front of the main aerofoil. By closely observing certain birds Dr. Thurston has discovered that they make extensive use of a small feather pivoted to the leading edge of their wings, and he is convinced that in so doing they obtain a great deal of extra controllability. Working on the same basic principle as that which influenced the designers of early locomotives when they chose wheels instead of complicated mechanisms to imitate the legs of a horse, Dr. Thurston has been experimenting with what he terms "rotary thumbs" (the bird's feather referred to corresponding to a thumb). These lie normally snugly on the leading edge of the wing, but when a certain predetermined angle is reached, the spindle of the "rotary thumbs" rises and lifts the blades clear of the leading edge. The rush of air causes them to rotate, and tests have shown that in so doing they create a very powerful lift. We hope to give further details of this interesting development shortly.

Propeller Drive Transmission

THE Junkers firm of Dessau has been carrying out experiments recently with a W.33 type of single-engined machine having two propellers mounted out on the wings and driven by a new form of transmission. It will be recollected that the giant Junkers G.38 has long extensions to its propeller-shafts, but the latest experiments appear to relate to propellers placed laterally away from the engines.

Packard Diesel Designer Killed

CAPT. L. M. WOOLSON, aeronautical engineer of the Packard Motor Co. and designer of the Packard Diesel aeroplane engine, was one of three persons killed at Attica (New York State) on April 23 by an aeroplane crashing into a steep hill during a snowstorm.

Rockets!

ROUND the world by air-rocket in 1 hour 26 minutes, and Paris to New York in 24 minutes, is the possibility envisaged by M. Robert Esnault-Pelterie, the aeronautical engineer, in a communication to the French Institute. M. Esnault-Pelterie believes that rocket machines will soon replace aeroplanes in all long-distance transportations, and will even permit of travel from one planet to another.

GIVE YOURSELF A PACK ON THE BACK

A New Irvin Parachute

ONE of the latest developments in parachute design has recently been produced by the Irving Air Chute Co. of Great Britain, which they call the improved Form-Fitting Back-Pack parachute. For certain purposes this has several advantages over the ordinary seat-pack type of air chute. The introduction of this type is important, not because there is any marked additional measure of safety in the construction of the chute itself, but because this model shows a great advance in the refinements of design relative to added comfort and freedom to pilots and passengers in aircraft.

It is significant also because it anticipates a series of developments in the immediate future in the design of aircraft by which manufacturers of 'planes will recognise the logical use of the chute for passengers as well as pilots, and make a place for it as standard equipment in the designs of modern 'planes.

It is quite clear to everyone who is interested in the development of the aeroplane that still greater attention is being paid to refinements in design now than ever before. There is ample evidence of this already. Modern aeroplanes do not merely fly. They must also embody refinements in comfort and appearance, as well as the results of constant progress in speed and safety. Even to-day there are various types of cabin 'planes with interior decorative effects which the war fliers of a dozen years ago did not dream would be possible.

Partially with these thoughts in mind the present form-fitting back-pack air chute was designed. Of course, ample consideration was given to the practical phases of the question.

There are open 'planes in which a seat-type parachute raises a man too high up in the cockpit. In some types of open 'planes, both military and commercial, the cockpit is so small that it is difficult to escape in an emergency with the seat-pack or ordinary back-pack.

This form-fitting back-pack overcomes these difficulties and is highly adaptable for use in 'planes where the seat-pack or other types are not comfortable or efficient. It is much thinner than the ordinary back-pack, and the pack frame is constructed from a special resilient spring steel wire, carefully formed so that the pack fits the contour of the wearer's back and adapts itself to it.

Because of the fact that the air chute itself is folded over a greater area, the thickness is reduced to a minimum, thereby permitting a more ready and easy escape from cramped quarters during an emergency. The pack literally clings to the wearer's back, and there are no projecting corners or parts which can possibly catch upon the aircraft and retard the escape of a person climbing from a small cockpit or through a small cabin door.

This chute has the same features which are to be found in the seat pack, the same arrangement for the rip-cord and the same harness design. It is fully as efficient as the seat-type in every way.

So much for the practical side of the question. Now we return to those important phases which have to do with aeroplane design. Hitherto no parachute has fitted decoratively the interiors of fine cabin aeroplanes. But the form-fitting back-pack is particularly adaptable for use in cabin machines since it can be incorporated into the back of the cabin chair, and made to fit in with the upholstery and interior decorative design of the 'plane.

In relation to this form-fitting air chute a new type of aeroplane chair has been perfected. Into this the chute fits perfectly, and may be made quite inconspicuous in the 'plane's interior. This involves no extra weight in the chair itself, nor in the parachute.



Easy exit from the open cockpit of an aeroplane is a feature of the new Irvin "Form-Fitting Back-Pack" parachute, as shown above.

It is so arranged that when a passenger enters the 'plane he merely sits down in the chair and, if he wishes, slips his arms through the harness. The pack remains at all times in the chair unless it needs to be used in an emergency, the harness slipping easily on and off, and, when unoccupied, it rests over the back of the chair. The occupant of the chair has the advantage of an unusually comfortable seat as well as the welcome assurance of the utmost in safety at all times.

Aircraft designers have been quick to see the advantages of this type of air chute in designing and constructing 'planes for passenger-carrying purposes. Certain engineers have already expressed keen interest in the possibilities of the use of this chute in aircraft design, and are making preparations to work with the Irving Company in designing aircraft interiors to embody the use of this chute in the most advantageous way. As fast as this chute becomes known undoubtedly other manufacturers will also incorporate it into their designs, as least on an optional basis. Naturally, the Irving Air Chute Co. will be glad to work closely and collaborate in any way possible with such manufacturers.

Another form of Irvin Air Chute in which the comfort, as well as the safety, of the user has been considered

is known as the "Quick Connector" pattern. In this, as the name implies, instead of the pack being on the harness as in other types, it is an independent unit, placed conveniently in the cabin or cockpit. The harness, which is comfortable and light, is, however, worn all the time, and when the moment for action arrives the pack is pulled off its rack or shelf and secured to the front of the harness by two simple hooks and links—similar to those on watch chains or dog leads. The pack is very easily connected, it being merely necessary to hold the pack across the stomach and jerk the links against the hooks. The advantage of this parachute is that the user is free to move about without being encumbered with a pack.



This illustration shows how the new "Form-Fitting Back-Pack" adapts itself to the wearer and the aeroplane chair. The wearer may rise from the chair with the pack in situ without difficulty, or he may slip the harness off.

AIR TRANSPORT

LAST YEAR'S ACTIVITIES BY BOEING AIR TRANSPORT

PLANES operated by Boeing Air Transport on the Chicago-San Francisco route, flew 2,780,000 miles in 1929 as compared with a total distance of 1,817,699 miles in 1928, according to a report of Boeing system activities, recently published by company officials. Included in the total number of miles flown in 1929 is the mileage of an extra nightly round trip air mail flight, inaugurated May 1, 1929, in which approximately 1,300,000 miles were flown during the year.

Air mail loads increased from 493 tons in 1928, to 906 tons in 1929; the number of passengers carried increased from 1,963 to 2,850. Boeing completed on December 25, 1929, the flying of 8,000,000 miles on the San Francisco-Chicago and Los Angeles-Seattle routes, with only three fatalities in thirty months of operation.

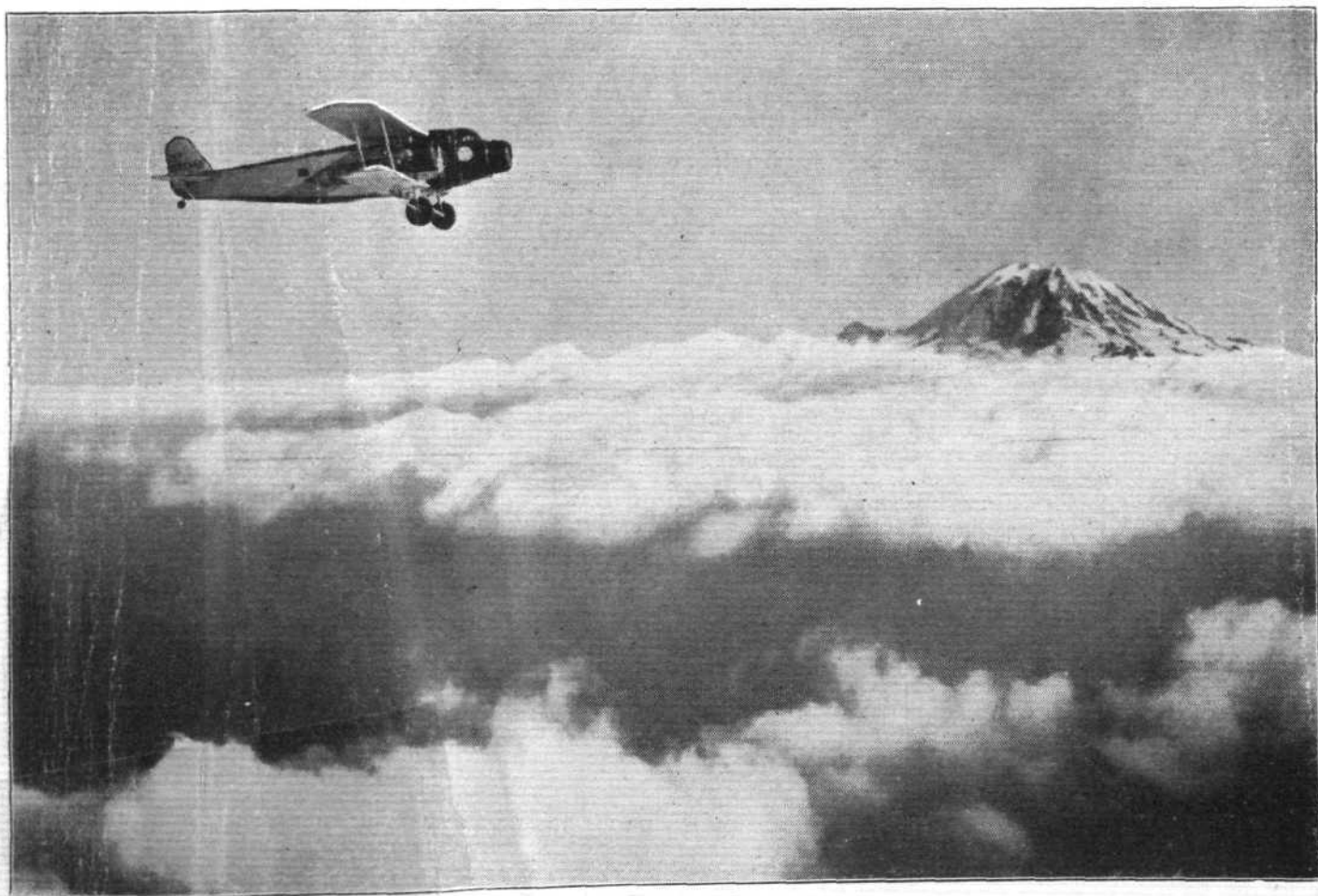
In addition to the night air mail flight inaugurated on May 1, the company began the operation of regular scheduled night passenger service between Oakland, Calif., and Salt Lake City, during the year. The company recently started preparations for the establishment of passenger transport service with trimotor planes, and has taken delivery of eight trimotor Boeing eighteen-passenger transports for this purpose.

It has also completed experiments for the purpose of developing a radio communication system; and a workable

radiophone system of voice communication between pilots and the ground and between pilots of planes in flight was designed. By now the company should have completed the equipping of its planes on the San Francisco-Chicago route with radio.

Planes of Pacific Air Transport, a unit of the Boeing System operating between Los Angeles and Seattle, flew a total of 830,000 miles during 1929, as compared with a total of 699,582 miles in 1928; 3,279 passengers were carried during 1929, as compared with 1,484 in 1928; the number of pounds of mail carried increased from 137,988 in 1928 to 254,457 in 1929.

Pacific Air Transport was acquired by the Boeing Company in 1927, and now utilises only Boeing equipment. During the year all of the Boeing Model 40-B planes were re-powered with "Hornet" and "Wasp" engines manufactured by the Pratt and Whitney company. The company reduced passenger rates seven cents a mile in 1929, and by the use of automatic refuelling system saved four minutes at each of the eight stops on the route, shortening the northbound schedule 1 hr. 45 min., and the southbound 1 hr. 15 min. Improvement work was completed during the year at several of the airports and terminals maintained by the company on its Pacific Coast routes.



A Boeing 3-engined (525 h.p. Pratt and Whitney "Hornet") cabin 'plane employed on the Chicago-San Francisco air service. It has accommodation for 18 passengers. As will be seen, these machines have to fly over mountain ranges on certain sections of the route.

Northern Air Line's Successful Year

THE successful record of Northern Air Lines, Limited, who have completed their first year's work, suggests that Manchester business men are realising that speed is money in these days. For some months after the opening of the air port Manchester firms were shy of using the air facilities, but lately they have been conquering their conservatism, and the

company is doing increasing business. The four employees of a year ago have become 41, who are almost all Manchester men, and the fifteen aeroplanes of the company are operated by nine pilots. In January last the temporary field at Wythenshawe was abandoned for the up-to-date air port at Barton, where repair work on an extensive scale is carried on and a number of Manchester people are taught to fly.

CORRESPONDENCE

[The Editor does not hold himself responsible for opinions expressed by correspondents. The names and addresses of the writers not necessarily for publication, must in all cases accompany letters intended for insertion in these columns.]

AIRCRAFT AND THE NAVAL CONFERENCE

[2296] Nothing shows more clearly the progress that flying is making in the world than an examination of the Treaty signed by the Five Powers at St. James's Palace on April 22, with its frequent references to aircraft and aircraft carriers. This gives an indication of the great part aeroplanes and seaplanes are expected to play in future naval warfare.

It is interesting to examine the Treaty from the air point of view, and to see what may be done under it, and what developments are likely to take place in consequence.

Article 3 amends previous definitions of Aircraft Carriers as follows: "The expression Aircraft Carrier includes any surface vessel of war, whatever its displacement, designed for the specific and exclusive purpose of carrying aircraft, and so constructed that aircraft can be launched therefrom and landed thereon."

"(2) The fitting of a landing-on or flying platform or deck on a capital ship, cruiser or destroyer, provided such vessel was not designed or adapted exclusively as an aircraft carrier, shall not cause any vessel so fitted to be charged against or classified in the category of aircraft carriers."

"(3) No capital ship in existence on the 1st April 1930 shall be fitted with a landing-on-platform or deck."

It follows from the above that every war vessel may have aircraft launching apparatus, and may launch as many aircraft as she can carry. Normal aircraft can only alight either on the sea, on the decks of an aircraft carrier, or on flying decks fitted to cruisers. In part 3 of the Treaty, which is only agreed to by Great Britain, Japan and the U.S.A., only a quarter of the total tonnage of cruisers may be fitted with flying-on decks, and doubtless this proportion will be so provided. This provision may lead to the building of cruisers in groups, four in a group, three with normal armament and catapult launching apparatus, and one with reduced armament, a flying deck, and accommodation for the other cruisers' aircraft as well as her own.

Under this Treaty the launching of aircraft is facilitated. Also there is no difficulty about operating seaplanes that can be hoisted in, but there weather conditions impose their own very strict limitations and practically confine their use to harbour bases; the great difficulty imposed is to land normal aircraft after they have completed their flight.

The normal response to this would be to have special ships with alighting decks to pick up the aeroplanes sent up from the fighting ships, for the aircraft carriers can only deal with their own.

This is hampered by article 8 of the Treaty, which would allow you to have as many auxiliary ships of under 600 tons for the purpose as you wish—too small to be of any use in practice. They could be of any speed.

Or you may have as many auxiliary ships as you desire for the purpose up to 2,000 tons—again too small—if their speed is limited to 20 knots.

Auxiliary ships bigger than this may not receive aircraft from the air, but they may launch any number up to three and recover them from the sea. Their speed, too, must not exceed 20 knots.

The Treaty does not deal with Reserve ships, only ships which are part and parcel of the Nation's navy. Therefore, in wartime, ships of the Mercantile Marine could be used to receive aircraft, and it is important that our new fast liners should be built with this object in view.

It will be seen that for work such as slave dhow patrol in the Persian Gulf, auxiliary ships carrying three large seaplanes, which can be hoisted out in sheltered water, are quite permissible, and their use there and on the Yangtze River, and West River in China are strongly indicated.

Old aircraft carriers may be reduced to hulks. Then their propelling machinery must be removed, and their aircraft lifts. This would seem to leave them still of use as repair and store depots in parts of the world where it is difficult to find facilities ashore for the purpose, much as many old wooden battleships were used.

The Treaty-makers have forgotten the airship, though two formidable examples are now building for the United States Navy, and which are likely to be of as great use for long-distance work as the aeroplane is evidently recognised to be for distances up to 250 miles from their base.

They also seem to have forgotten the Autogiro. There seems no doubt that these craft could alight on the quarter

deck of any large warship, or on to a net spread above it, without requiring any modification to her main armament.

Incidentally, we are to be allowed to keep the *Ark Royal*, that veteran little aircraft carrier, for experimental work; also the Australian seaplane carrier *Albatross*, giving an undertaking that it shall not be used for any combatant purpose. The training ships of France, Italy and Japan are to have all aviation facilities and accessories removed. Further, 10 per cent. of the destroyer tonnage may be transferred to cruisers, with the concurrent possibility of increased alighting facilities for aircraft for any nation that wishes to develop its Naval air power to the uttermost.

No reference is made to the use of aircraft from submarines—a common practice—but a perfectly puerile agreement is reached about the treatment of crews of merchant ships sunk by them, by which a submarine's commander can turn a ship's crew adrift in their boats, provided he thinks they will float till they reach the land or are picked up by another vessel he believes to be in the proximity.

That is about all of interest to the air-minded. The Treaty may be said definitely to mark an international opinion that in future the control of the sea and what passes on it will be largely exercised from the air over it.

Cowes,
April 23, 1930.

F. L. M. BOOTHBY,
Capt. R.N. (ret.).

AIR ACCIDENTS

[2297] With reference to the recent letters published in your correspondence page, headed "Air Accidents."

It certainly would appear dangerous to drop tanks containing petrol, no matter what was underneath. Of course, in time of war, military aircraft, if forced to land on enemy ground, could drop their tanks with relief and in the hope of hitting something worth while!

Would it not be possible to have petrol tanks fitted with non-leakable release doors at the trailing edge of the tank? This would be operated by the pilot when a dangerous forced landing had to be made.

The quickly escaping petrol would pass away from the trailing edge of the wing into space, where it should evaporate with no danger to the occupants of the aeroplane or those on the ground. Of course, the engine exhaust of the aeroplane would have to be led away a safe distance from the escaping petrol.

There is one drawback, in that it might be found impossible to design a satisfactory non-leaking tank.

It is noticeable that most war machines of to-day are fitted with petrol tanks in the wings, which would appear to be a very exposed position to enemy fire, unless made bullet proof or self-sealing.

Of course, the wing is the best place for petrol tanks, both on account of fire, and for gravity feed to the engine, and no doubt some form of bullet-proof or self-sealing tank could be fitted in time of war.

The only satisfactory prevention against fire would appear to be the compression-ignition engine.

A. GARDINER.

Kew, Surrey.
March 29, 1930.

P.S.—The suggestion by "N. D. N." in his letter (2290) of attaching parachutes, would appear to be dangerous, as the parachute on opening would drift directly on to the tail plane.

A. G.

[2298] I am sorry I offended Mr. Everington in my previous letter. Nothing of the kind was intended.

In letter 2293 he says that I rather miss the point of his suggestion. I think that he misses a greater point, being apparently of the opinion that it does not matter if there is an explosion in "fields and unpopulated country," as there is no-one there to be hurt. I might have put to "people and property" in my letter, as there is not much unpopulated country in England, and with the "bomb" coming down in a field there is very small chance of it not devastating cultivated land or destroying live stock and possibly killing or injuring a lonely wanderer as well as leaving a crater to be filled in. The explosion may also have some effect upon the aeroplane. Anyway, it would be decidedly better if the explosion does not occur. I was not referring to forced landings over houses as the aircraft should be at a great enough

height when flying over them to land (or crash) outside them.

Mr. Everington does not mention letter No. 2285, which refers to his idea as dropping "high-explosive petrol bombs."

As to the machine being too low for the parachute to take effect, I said in my letter that the parachute "would draw the tank off," meaning a "pull-off" and not a "live drop." The parachute would also make the action positive. But granting that dropping the tank with or without parachute is impractical, why is not a "dump valve" tied to it as is, I understand, so popular in America.

Streatham, S.W.16.

N. D. N.

POWER-DRIVEN MODELS

[2299] I was surprised to see a description of the Model Aircraft Club's petrol-driven model aeroplane in your issue of the 28th of last month.

I should be glad to hear whether this model has done any real flying, and if so, what its performance is like. At public demonstrations it has, as far as I know, never left the ground, having been caught at speed in good time. Is it not supposed to fly?

The design does not impress me as suited for this kind of work, and Mr. Dowsett would have done well by forgetting the standard layout of small models and borrowing some ideas from full-size practice.

I fully realize the difficulties encountered in designing and building such a model and, apart from the fact that I do not like the design, I admire Mr. Dowsett's enterprise. But why advertise this model before it has shown its merit? And if the thing *has* to be published—though I cannot find any reason—why not let it be known that it must still do so? I think this is the first description of a model that has not flown or cannot fly which has appeared in any aeronautical journal. It seems to me that this model has lately been used as an advertisement for the T.M.A.C., as announcements have appeared in the Press from time to time, stating that it would perform at its meetings.

This letter expresses my personal opinion, and does not in any way represent the opinions of other members of the S.M.A.E.

Scheveningen, Holland.

JUSTE VAN HATTUM

April 5, 1930.

[NOTE.—We have shown Mr. Dowsett a copy of the above letter, and publish his reply below.—ED.]

[2300] Replying to Mr. Van Hattum's letter (a copy of which you have submitted to me), I am not surprised to

hear that he is quite certain the "Hawk-Special" has never flown, as a man whose ideas of Model Aircraft are centered round "Twin-pushers," and indoor "Feather-Planes," with a total weight of 2 or 3 ounces, can hardly be expected to believe that a model with such a terrifying (?) weight as the "Hawk" could ever leave the ground.

Whilst deeply regretting the necessity of contradicting Mr. Van Hattum's expert opinion, I feel bound to make the performance public. On two occasions the machine has made perfect flights of over four minutes, and on both occasions it was flying well when the petrol supply failed (the only means of controlling being by limiting the supply of fuel). One of these flights, at Epsom, last February, was observed by Mr. S. T. M. Courteen, 15, Courtneil Street, Bayswater, who was assisting me at the time, and he will no doubt verify the time in the event of there being any doubt in the matter.

With regard to public demonstrations, only on two occasions has the machine been advertised to fly. The first at Epsom in September, 1929, when an accident resulting in a broken propeller stopped any efforts to get the machine in the air, and the second, at Wimbledon, in March, when bad weather, rough ground, a badly warped main plane, and people spread all over the flying ground, are, I think, sufficient reasons for its failure on this occasion.

The enquiries I have received from readers in England, France and Egypt, have proved that the article was of great interest to hundreds, and this, I think, is sufficient reason for publication.

HERBERT H. DOWSETT

Brixton, S.W. 9.

WHO KILLED BARON VON RICHTHOFEN

[2301] Having been a subscriber to FLIGHT for a great number of years I read with interest the Richthofen account by F. A. de V. R. in FLIGHT issue of March 14.

You will be probably interested to know that Roy Brown is at present engaged as pilot on Air Mail work Calgary-Winnipeg and W. R. May (Wop May) who, by the way, is a Canadian, is operating out of Edmonton (Air Mail pilot) to the Arctic.

I happened to be in the R.A.F. (109027) and was at No. 2 A.S.D. when the Fokker (Richthofen's) was brought in. I still retain parts of it. Brown was given credit for killing the Baron, but it is quite possible and very probable he was shot by a rifleman from the trenches.

S. J. SHERLOCK

Calgary, Alta, Canada.

March 27, 1930

MODELS

PILCHER CUP COMPETITION

THIS competition was held on Wimbledon Common on Saturday, April 26, and attracted a large number of entries from the S.M.A.E. and T.M.A.C. The weather was dull, but calm. The fuselage models had to rise from the ground under their own power. During the preliminary flights the *Graf Zeppelin* passed over head accompanied by an escort of full-sized aeroplanes, the large gathering of spectators thus witnessing an interesting and unusual sight.

Mr. Willis's model ("Cross-Country" type!) was first away in the competition, rising from the road without any effort and attaining an altitude of about 80 ft. during a flight of 65 seconds. It soon became apparent that the durations were likely to be high.

Mr. Newell got his Falcon away. Rising from the road, the model climbed gradually over towards the woods, but turned when over the trees and came back down wind, ending its flight with a good glide, after remaining aloft for 76 seconds.

Messrs. Bullock, Evans, Ives, Welding, each got their models off well, and made some excellent flights. A noticeable feature of the competition was the slow rate the propellers revolved on several of the models, especially on the machines flown by Messrs. Bullock, Ives and Willis.

The competition developed into a struggle between Willis, Bullock, Newell and Ives, either of whom appeared likely to beat 76 seconds. Willis got near it with a flight of 69 seconds—his third attempt. Bullock returned a duration of 74 seconds during the last round. However, Newell's first flight of 76 seconds won the competition.

In between the flights of the competition Mr. D. A. Pavely flew a spar tractor model, and succeeded in breaking the British duration records for this type of model with a flight

of 1 minute 51 seconds R.O.G., and 1 minute 50 seconds hand launched.

A general all-round improvement was shown in the quality of the flying and the excellent duration recorded by most of the models proves that the limit of efficiency of elastic-driven fuselage models has by no means been reached. Mr. Langley and Mr. Crouch were judges.

THE MODEL AIRCRAFT CLUB T.M.A.C.

GREAT interest in full-sized Gliders has been shown in the club. It is believed that there are many among the 300 members who would like to participate in this popular sport.

It has been decided to form a gliding section of the T.M.A.C. All who are interested should write to Mr. John Welding, 404A, King's Road, Chelsea, S.W.5, who has undertaken the organisation of this section.

Parliament Hill Section

A large gathering of members on Sunday morning enjoyed some excellent flying.

Mr. W. R. Burnett getting some fine flights with his "Bantam," doing an average of 30 seconds.

Mr. Mincher brought along a new fuselage model which was very much admired, its flying qualities being very good.

Messrs. Burchell and Davis were busy gliding their models, getting ready for Sudbury on May 10.

Mr. Rutherford put up a performance of 50 seconds. Master Walker's model was flying very well, his best being 36 seconds.

Messrs. Debenham, Yeomans, Trevithick and Knight all put up good flights, averaging from 20 to 30 seconds.—Hon. Secretary, A. E. Jones, 48, Narcissus Road, West Hampstead, N.W.6.

THE SCHNEIDER TROPHY—1929

By FLIGHT-LIEUT. H. R. WAGHORN, A.F.C., R.A.F.

A lecture before the Westland Aircraft Society, Yeovil Branch of the Royal Aeronautical Society, on February 14, 1930

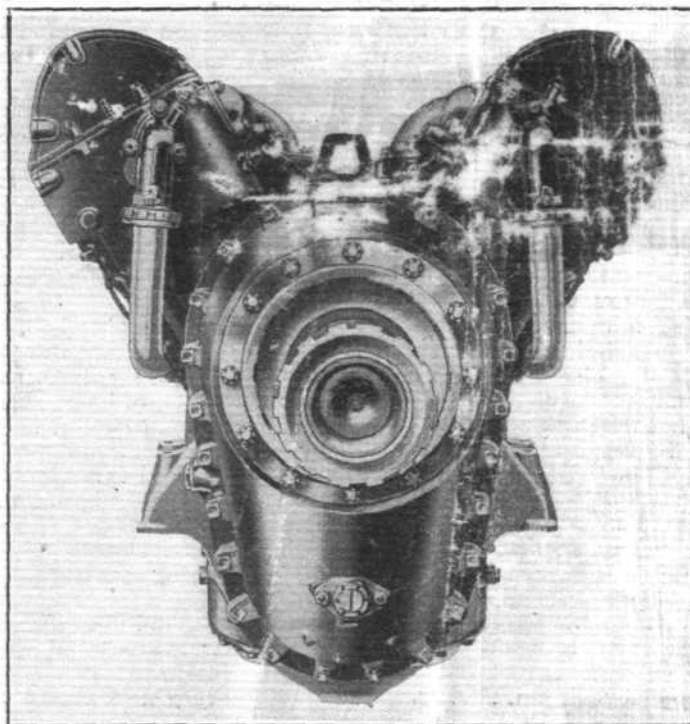
(Concluded from page 468)

AT about 7 minutes to two my engine was started by Love-say, the Rolls expert, and was run by him for barely two minutes. I then climbed in and made myself as comfortable as possible. At two minutes to two I was lowered into the water and started to take off immediately. I will here digress slightly and describe in detail the procedure followed after opening up the throttle, as the S.6 was in many ways peculiar. Owing to the slow revolutions of engine and propeller, coupled with the great power and consequent torque effect the first thing that happened on opening up the engine was that the left wing tried to dig itself into the water. This almost submerged the left float, and the drag so produced swung the machine rapidly to the left, making her quite uncontrollable, the more the machine swung to the left of the wind the more rapid did the swing become until centrifugal force became greater than the drag of the left float, and she would suddenly throw her right wing down rather violently, making it essential to shut off the engine. With a fairly fresh wind and full load it is advisable to take off directly into wind, and with that end in view, we found it essential to point the machine about 70 degrees to the right of wind and to have right rudder on from the start. The machine then runs along with its left wing a few inches from the water across wind but not swinging. She is clear of the spray which, up to 30 m.p.h., completely envelops the pilot. Having got her, therefore, running across wind at 40-50 m.p.h. one is now confronted with what is really the trickiest part of the proceedings, and that is to get her into wind without letting her swing right round, which she will want to do; once left rudder is applied, the machine will accelerate rapidly, provided you have not put on too much rudder should reach her hump speed by the time she is directly into wind. At this point she assumes a new position on the water—very much lower in front—and accelerates rapidly up to taking off speed. She seems to leave the water at about 100 m.p.h., and I have never been able to take off with full load without two or three bounces.

To return to the race, once off the water I made my way towards Old Castle Point, and then turned left and dived down over the starting line at about 350 miles an hour. The pylons were mounted on destroyers and stood out quite well, provided they were not anchored against a background of shipping. One could not get a view directly ahead, and I had to pick up the correct line largely while turning the previous pylon. On the long legs we picked our course mainly by landmarks or shipping which we passed over. As an example, the Seaview turn was anchored, say, half a mile from the shore. By plotting our radius of turn on the chart and from previous practice, we knew that we should have to have the coast, say, 500 yards on our right. By aiming to do this we would arrive approximately the correct position, when within 200 yards off the pylon we could see it, so that the actual turn itself was gauged with the pylon in view.

The first lap was naturally the most difficult because we were not used to the various groups of shipping, which afterwards helped so much to our course keeping. As an example, while passing the Seaview turn on my first lap, I looked for the Chichester turn ship and picked out the only isolated vessel in that area. I made for it, and while still some little way from it, saw the pylon away on my left. I had been quite unable to see it as it had a background of shipping immediately behind it. The ship which I had mistaken for the turn ship, was, in fact, an oil tanker, and should not have been allowed to stray where it was. Atcherley actually turned from it. My own detour cost me 6 m.p.h., and that is the reason my first lap speed was only 324 m.p.h. From the Chichester turn I could see the Southsea pylon while still turning and had no difficulty at all in passing it, the esplanade on my right being also a great help. Next I came to what was the most difficult lap of the course—that from Southsea to Cowes—as there was no land and practically no shipping to guide one on approaching the turn. To make matters more interesting for the competitors, someone had conveniently parked a Flotilla of Destroyers immediately behind the pylons; hence, the amazing turns of some of the Italians embracing all the destroyers. I think in any future race (if there is one) the authorities should make quite sure that there be a lane quite clear of ships behind the pylon as viewed from the direction of approaching aircraft; this, of course, isn't the

same thing as a lane in continuation of the actual course, since the aircraft approach the turn very wide. Once round the Cowes turn the course was plain sailing again, there being plenty of shipping and the shore of the Isle of Wight to help one.



The Rolls-Royce "R" Engine.

I had completed several laps, everything was going beautifully—never a miss from the engine and the machine handling perfectly—when I noticed the Italian Macchi diving towards the starting line just as I was coming up to the Cowes turn; at the Seaview turn I couldn't see him at all; at the Chichester turn I saw him a speck in front, and at the Southsea turn I saw him disappearing over Alverstoke. This time much nearer, and as I was obviously overtaking him rapidly, the question was—could I overtake him on the straight before the Cowes turn or just after? I hoped for the latter, for if I should catch him before the turn I should not be able to see him. However, it planned out as I hoped, for on rounding the Cowes pylon I saw him just coming out of his turn a few hundred yards in front. I decided to pass him on the inside and swung about a hundred yards to the left clear of him. I passed him about half way down the straight.

By now I had completed five laps and everything was going just as it should. The air in the cockpit was very hot, but owing to a stream of fresh air from a ventilating pipe over my face I wasn't too uncomfortable. An attempt to rest my knees on the sides of the fuselage was abruptly stopped when I discovered that they were, to all intents and purposes, "red-hot," a slight exaggeration, perhaps, but that is what it felt like; and through my slacks, too! I was flying about 150 to 200 ft., as I found that at that height I got the best view of the course, and it was sufficiently low to be able to keep level. I had been running all the time somewhat below full throttle, as owing to the unexpected increase in power and consequent petrol consumption of the engine, she would not last the course with the petrol we were able to safely carry. The rate that petrol can be poured out of a two-gallon tin will give some idea of the rate that the engine was consuming its petrol during that race. I had therefore been told on no account to use full throttle as I shouldn't finish the course; imagine then my feelings when the engine momentarily cut right out and started missing badly just after I had finished what I imagined was my 6th lap. Would the Rolls engineers ever believe that I hadn't given full throttle? I began to gain height and continued round the course with the engine spluttering and only taking about half throttle. I climbed